34379

[redacted]

National Library of Canada
Bibliothèque nationale du Canada

CANADIAN THESES ON MICROFICHE

THÈSES CANADIENNES SUR MICROFICHE

NAME OF AUTHOR/*NOM DE L'AUTEUR* FRANK R. JASPERSE

TITLE OF THESIS/*TITRE DE LA THÈSE* SEASONAL VARIATIONS IN EMPLOYMENT — THE SERVICE INDUSTRIES OF ALBERTA

UNIVERSITY/*UNIVERSITÉ* UNIVERSITY OF ALBERTA

DEGREE FOR WHICH THESIS WAS PRESENTED/*GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE* MASTER OF ARTS

YEAR THIS DEGREE CONFERRED/*ANNÉE D'OBTENTION DE CE GRADE* 1977

NAME OF SUPERVISOR/*NOM DU DIRECTEUR DE THÈSE* DR. S. E. DRUGGE

Permission is hereby granted to the NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

L'autorisation est, par la présente, accordée à la BIBLIOTHÈQUE NATIONALE DU CANADA de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans l'autorisation écrite de l'auteur.

DATED/*DATÉ* OCT. 21/77 SIGNED/*SIGNÉ* F. R. Jasperse

PERMANENT ADDRESS/*RÉSIDENCE FIXE*
2001, 10883 SASK. DR.
EDMONTON, ALBERTA
T6E 4S6

NL-91 (3-74)

National Library of Canada

Cataloguing Branch
Canadian Theses Division

Ottawa, Canada
K1A 0N4

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

Bibliothèque nationale du Canada

Direction du catalogage
Division des thèses canadiennes

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

NL-339 (3/77)

THE UNIVERSITY OF ALBERTA

SEASONAL VARIATIONS IN EMPLOYMENT - THE SERVICE INDUSTRIES OF ALBERTA

by

© FRANK R. JASPERSE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF ARTS

IN

DEPARTMENT OF ECONOMICS

EDMONTON, ALBERTA

FALL, 1977

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled, SEASONAL VARIATIONS IN EMPLOYMENT - THE SERVICE INDUSTRIES OF ALBERTA

submitted by FRANK R. JASPERSE

in partial fulfilment of the requirements for the degree of Master of ARTS

....

Supervisor

Shmuel Sharir

....

Date OCTOBER 13, 1977

ABSTRACT

This thesis examines the economics of seasonal variations in employment of the Alberta service industries. Seasonality has long been known to exert significant influences on employment in many Canadian industries. With the service industries accounting steadily for progressively larger shares of total employment, it was not known if the characteristics of these industries was such that the effects of seasonality would moderate or increase with the passage of time.

The economic theory underlying seasonality states that seasonal amplitudes in employment are a function of: (a) the industry's product demand curve shift, (b) the elasticity of the product supply curve, (c) the degree of fixity of the workers, (d) the ability of the industry to accumulate inventories, (e) whether or not additional workers are hired during peak periods, and (g) whether or not a firm decides to meet a seasonal increase in demand.

Seasonality was measured by means of seasonal factors for the Alberta service industries and these were calculated by using the X-11 Variant of the Census Method II Seasonal Adjustment Program on the relevant employment time series.

It was found that for comparable industries, the seasonal factors for Alberta services had twice the amplitude of Canadian service industries. Reasons for this behavior were examined in the context of the economic theory behind seasonality. However, many hypotheses were unable to be tested because of the data deficiencies that were encountered. Tests were run to show that a negative linear

correlation coefficient existed between average industry wage rates and industry seasonal variation in employment, as well as to show the presence of stable seasonality over the duration of the study.

TABLE OF CONTENTS

Page

ABSTRACT.. iv

TABLE OF CONTENTS... vi

LIST OF TABLES.. ix

LIST OF FIGURES... xi

INTRODUCTION.. 1

CHAPTER

I THE ECONOMICS OF SEASONALITY IN EMPLOYMENT............... 6

Product Markets... 6

Factor Markets.. 12

Labor as a Quasi-Fixed Factor............................... 15

Transfer Payments... 21

II QUANTITATIVE SEASONAL VARIATIONS......................... 23

The Persons' Model.. 23

The Shiskin Program... 26

III INTER-INDUSTRY COMPARISON: THE SEASONAL VARIABILITY OF TWO ALBERTA SERVICE SECTORS AND OTHER PROVINCIAL INDUSTRIAL SECTORS.. 33

Data: Sources and Methods................................... 33

The Alberta Sectors to be Examined.......................... 35

Stable and Moving Seasonal Factors.......................... 38

The Seasonal Factors of the Alberta Sectors................. 42

F-Test.. 52

Summary: The Seasonal Factors............................... 54

CHAPTER Page

Testing Oi's Hypothesis.. 55

The Cyclical Factor.. 56

IV INTRA-INDUSTRY COMPARISON: THE SEASONAL VARIABILITY OF ALBERTA'S COMMUNITY, BUSINESS AND PERSONAL SERVICES........................ 64

Data: Sources and Methods...................................... 64

The Alberta Services to be Examined............................ 65

The Seasonal Factors of the Alberta Services................... 67

Summary: The Seasonal Factors.................................. 73

The Anomaly Presented by the Seasonal Factors.................. 74

Testing Oi's Hypothesis.. 76

The Cyclical Factor.. 76

V INTRA-INDUSTRY COMPARISON: THE SEASONAL VARIABILITY OF CANADA'S COMMUNITY, BUSINESS AND PERSONAL SERVICES........................ 82

Data: Sources and Methods...................................... 82

The Seasonal Factors of Canada's Services...................... 83

Summary: The Seasonal Factors.................................. 91

Testing Oi's Hypothesis.. 93

The Cyclical Factor.. 93

VI THE SEASONAL FACTORS OF THE COMMUNITY, BUSINESS AND PERSONAL SERVICES: AN OVERVIEW.............................. 99

The Small Firm and the Excluded Services....................... 99

The Seasonal Factors for Alberta and Canada.................... 102

Trend or Time Conditioned Seasonal Factors..................... 106

Summary of Findings.. 107

Counteracting Seasonality: Government Solutions................ 109

Counteracting Seasonality: Business Solutions.................. 115

CHAPTER Page

Economic Costs of Seasonality in Employment.......... 116

Conclusion.................................... 118

BIBLIOGRAPHY.. 121

APPENDIX.. 124

LIST OF TABLES

TABLE Page

1 Range of Seasonal Factors, 1961 and 1969 3

2 Average Male Income by Occupation, 1970 19

3 Employees per Establishment, Service Trades, Alberta and Canada, 1966 35

4 Total Labor Force, Alberta, 1951 and 1971 37

5 Standard Deviation of Average Seasonal Factors from the Mean, Alberta Sectors, 1961-1968 48

6 Range of Seasonal Factors, Alberta Sectors, 1961-1968 49

7 Month of Extreme Amplitude of Seasonal Factors, Alberta Sectors, 1961-1968 50

8 Stable Seasonality Test, Alberta Sectors, 1961-1968 54

9 Linear Correlation Coefficient: Seasonal Variability of Employment and Industry Hourly Wage, Alberta Industries 57

10 Growth of the Henderson-Derived Cyclical Factor, Alberta Sectors, 1961-1968 63

11 The Service Industries, Alberta, 1971 65

12 Standard Deviation of Average Seasonal Factors from the Mean, Alberta Services, 1961-1968 68

13 Range of Seasonal FActors, Alberta Services, 1961-1968 68

14 Month of Extreme Amplitude of Seasonal Factors, Alberta Services, 1961-1968 72

15 Stable Seasonality Test, Alberta Services, 1961-1968 73

16 Linear Correlation Coefficient: Seasonal Variability of Employment and Industry Hourly Wage, Alberta Services 77

TABLE Page

17 Growth of the Henderson-Derived Cyclical Factor, Alberta Services, 1961-1968 77

18 The Service Industries, Canada, 1971 84

19 Standard Deviation of Average Seasonal Factors from the Mean, Canada Services, 1961-1968 84

20 Range of Seasonal Factors, Canada Services, 1961-1969 90

21 Month of Extreme Amplitude of Seasonal Factors, Canada Services, 1961-1968 90

22 Stable Seasonality Test, Canada Services, 1961-1968 91

23 Linear Correlation Coefficient: Seasonal Variability of Employment and Industry Hourly Wage, Canada Services 98

24 Growth of the Henderson-Derived Cyclical Factor, Canada Services, 1961-1968 98

LIST OF FIGURES

FIGURE		Page
1	Perfectly Competitive Labor Market	12
2	Monopsonistic Labor Market	14
3	Major Components of an Artificial Time Series	25
4	Seasonal Factors, Non-agricultural Labor Force, Alberta, 1961-1969	43
5	Seasonal Factors, Manufacturing, Alberta, 1961-1969	44
6	Seasonal Factors, Transportation, Communications and Utilities, Alberta, 1961-1969	45
7	Seasonal Factors, Community, Business and Personal Services, Alberta, 1961-1969	46
8	Seasonal Factors, Trade, Alberta, 1961-1969	47
9	Cyclical Factor, Non-agricultural Labor Force, Alberta, 1961-1968	58
10	Cyclical Factor, Manufacturing, Alberta, 1961-1968	
11	Cyclical Factor Transportation, Communications and Utilities, Alberta, 1961-1968	60
12	Cyclical Factor, Community, Business and Personal Services, Alberta, 1961-1968	61
13	Cyclical Factor, Trade, Alberta, 1961-1968	62
14	Seasonal Factors, Business Services, Alberta 1961-1969	
15	Seasonal Factors, Personal Services, Alberta 1961-1969	70
16	Seasonal Factors, Hotels, Restaurants and Taverns, Alberta, 1961-1969	71
17	Cyclical Factor, Business Services, Alberta, 1961-1968	78

FIGURE Page

18 Cyclical Factor, Personal Services, Alberta 1961-1968 79

19 Cyclical Factor, Hotels, Restaurants and Taverns, Alberta, 1961-1968 80

20 Seasonal Factors, Community, Business and Personal Services, Canada, 1961-1969 85

21 Seasonal Factors, Business Services, Canada 1961-1969 86

22 Seasonal Factors, Personal Services, Canada 1961-1969 87

23 Seasonal Factors, Hotels, Restaurants and Taverns, Canada, 1961-1969 88

24 Cyclical Factor, Community, Business and Personal Services, Canada, 1961-1968 94

25 Cyclical Factor, Business Services, Canada, 1961-1968 95

26 Cyclical Factor, Personal Services, Canada, 1961-1968 96

27 Cyclical Factor, Hotels, Restaurants and Taverns, Canada, 1961-1968 97

28 Final Seasonal Factors, Alberta and Canada, 1969: Community, Business and Personal Services and Business Services 103

29 Final Seasonal Factors, Alberta and Canada, 1969: Personal Services and Hotels, Restaurants and Taverns 104

INTRODUCTION

The existence of seasonal fluctuations in many Canadian employment time series is a widely observed phenomenon.[1] These movements have been shown to be both large and recurrent, and account for much of the monthly variability evident in a given employment time series. In fact seasonal movements are the single most important source of change in monthly economic time series of various kinds. Shiskin measured seasonal variability by means of a seasonal factor on a broad sample of 150 U.S. economic time series for the period 1947-1956.[2] He found that the average monthly amplitude of seasonal fluctuations exceeded that of the cyclical factor in 78 percent of the series examined and that of the irregular factor in 65 percent of the series. In addition, Shiskin found that seasonal variations dominated by a multiple of three the cyclical factor in 45 percent of the series examined. Moreover, Daly has established that for a smaller sample of Canadian economic time series for the period 1945-1959, the average change in the seasonal factor was about six to seven times that of the cyclical factor.[3] And research done by the Department of Industry, Trade and

---

[1] Labor Canada, Economics and Research Branch: Seasonal Unemployment in Canada, Ottawa: Queen's Printer, 1954, and The Impact of Winter on the Canadian Worker, Ottawa: Queen's Printer, 1965.

[2] J. Shiskin, "Decomposition of Economic Time Series," Science, Vol. 128, 1958, p. 1544.

[3] D.J. Daly, "Canadian Experience with Seasonal Adjustment," Seasonal Adjustment on Electronic Computers, OECD, Paris, 1960, p. 156.

Commerce has further concluded that pure seasonal fluctuations for a given Canadian economic time series are double those for the same series in the United States.[4]

Studies have shown that the largest seasonal fluctuations in employment in past Canadian labor markets have occurred in such industries as agriculture, construction and transportation.[5] However, Census data clearly indicate that Canadian labor markets of twenty years ago are no longer the same as labor markets of today. The most remarkable changes over the period 1951-1971 are that employment in agriculture has fallen from 15.5 to 5.6 percent of Canada's labor force, while at the same time employment in the services in Canada has increased from 37.3 to 49.8 percent. The changes for Alberta are even more dramatic. Agriculture employment fell from 32.5 to 12.6 percent between 1951-1971, while employment in the services increased from 37.9 to 51.1 percent.

The principal causes of seasonal variations are, of course, climate, buying habits and conventional factors such as annual holidays. To the extent that employment in the service industries may be influenced differently by these factors than employment in the primary or secondary sectors of the economy, these differences would be exhibited in the respective employment seasonal factors. In other words, seasonal demand shifts in the product market may have different effects on employment in the service industries as compared to the primary and secondary industries. These differences will be observed.

---

[4] Industry, Trade and Commerce, Economics Branch, Recent Developments in Processing Seasonally Adjusted Data, Ottawa: Queen's Printer, 1956, pp. 10-11.

[5] Labor Canada, Economics and Research Branch, "Seasonal Variations in Employment and Unemployment," The Labor Gazette, Vol. LX, 1960, pp. 444-456.

The major objective of this research project will be to examine the service industries of Alberta and Canada for seasonal variability in as much detail as allowed by the available data. Data of any kind are difficult to obtain for the service industries. Little information - other than employment data - is released on a monthly basis for many of these industries. As data from the monthly Labor Force Survey in Table 1 clearly indicate, seasonal fluctuations are found to be strongest in Canada's unemployment time series, followed by Canada's employment time series. However, for the service industries in Canada and Alberta, monthly employment time series must be used as these are the only data available.

TABLE 1

RANGE OF SEASONAL FACTORS, 1961 AND 1969

CANADA	1961	1969
Labor Force	97.88 - 103.70	97.27 - 105.05
Not in Labor Force	95.72 - 102.50	93.72 - 103.37
Employment	94.90 - 105.47	95.82 - 105.54
Unemployment	69.99 - 144.85	72.99 - 126.88
Participation Rate	97.85 - 103.69	97.23 - 105.07

SOURCE: Statistics Canada, Historical Labor Force Statistics - Actual Data, Seasonal Factors, Seasonally Adjusted Data, Catalog No. 71-201, Ottawa: Industry, Trade and Commerce, February, 1975.

The seasonal factors for the service industries will be obtained by running the employment time series through the X-11 Variant of the Census Method II Seasonal Adjustment Program. The resultant seasonal factors for the Alberta service industries will be carefully examined to see whether or not they exhibit behavior different from that of other Alberta industrial sectors. Comparisons will also be made between the seasonal factors of the Alberta services and their corresponding industries for Canada.

All seasonal factors derived from the X-11 will be examined to see whether or not they are influenced by either trend or time over the duration of this study. Correlation coefficients will be calculated in an effort to determine whether or not seasonal variation in employment is associated with high or low industry wage rates.

Within the limitations of the available data, differences in the seasonal factors for large and small service firms will also be observed. In explaining the behavior of these firms, tests will be suggested, and the adequacy of available statistics on the service industries will be explored. And lastly, the question as to whether or not seasonal variations in employment incur costs for individual workers will be examined by way of a number of simplistic analytical models.

The course of this study will run as follows: Chapter I will discuss the economics of seasonal variation in employment. Chapter II will examine in detail how the X-11 Seasonal Adjustment Program is used to calculate seasonal factors for the various industries examined. Chapter III will compare seasonal factors for two Alberta service sectors to two other industrial sectors for the province. Chapter IV will disaggregate Alberta's Community, Business and Personal Services into individual sectors to be analyzed for seasonal variability in employment. Chapter V will perform the same analysis on these services for Canada as a whole. And finally, Chapter VI will draw conclusions from the preceding analysis in addition to examining federal government programs which have been legislated to counteract seasonality.

CHAPTER I

THE ECONOMICS OF SEASONALITY IN EMPLOYMENT

Product Markets

It does not necessarily follow that an increased seasonal demand for a final product must translate back to a corresponding increase in demand in the labor market. Consider perfectly competitive firms engaged in the production of goods which are faced with a seasonal shift in demand. Under such conditions firms are faced with a number of choices: one, they can sell from accumulated inventories, two, they can choose not to meet the increased demand during a certain period of time, three, they can attempt to increase their production, or four, they can choose to farm out the additional work. A consistent seasonal fluctuation in demand is not likely to catch profit-maximizing firms off-guard. Inventories might have been accumulated during the off-season to take advantage of the peak selling period. Thus a goods producer may find that it is possible to employ a relatively stable work force throughout the year. However, the decision to accumulate inventories must be carefully weighed against its attendant costs. The firm must measure this decision against such factors as the costs of storage, insurance, the prevailing interest rate and the fact that its product may experience physical deterioriation in storage.

It may prove to be cheaper for the firm to hire more labor for the short period of increased demand rather than to incur the costs of building inventories during the off-season. This will likely only prove to be the case, however, where little training is required by the workers. If long and substantial training of temporary labor is required, it may prove cheaper for the firm to accumulate inventories during the off-season. The decision to build inventories or to hire additional workers can be determined by the firm algebraically as follows:

Let, S = cost of inventory storage
I = cost of inventory insurance
$V(i)$ = opportunity costs: interest foregone on dollar value of inventory
D = cost of physical deterioration during storage
W = hourly wage rate of additional employees required during peak season
M = man-hour increase in production required during peak season
N = number of employees required to provide M
T = turnover, training and hiring costs per added employee
F = fringe costs per added employee

The decision to accumulate inventories during the off-season would result in $S + I + V(i) + D$ additional costs to the firm. If, however, no inventories are built, then the firm will face additional labor costs of $WM + TN + FN$, should it decide to meet a seasonal increase in demand. Therefore, a rational profit-maximizing firm will build inventories whenever $S + I + V(i) + D < WM + TN + FN$. One of the assumptions implicit in this argument is that firm has decided against scheduling overtime hours, in favor of hiring additional workers. If it proves less expensive to accumulate inventories, then this will result in less seasonality in employment for the firm.

Given the fact that the firm may decide to use additional labor resources to meet a seasonal increase in demand, it need not hire more workers. In many cases, the management of the firm has the prerogative to schedule overtime for its workers. The decision of whether or not to meet an increase in labor demand by scheduling overtime or by adding more employees can be determined algebraically as follows:[6]

Let, M = Man-hour increase in production
F = fringe cost per added employee
W = hourly wage rate of present employees
aW = overtime hourly wage
bW = costs additional to the premium of working overtime, such as hour-related fringe costs
cW = hourly wage of added workers
N = number of added employees to provide M if overtime not used
H = number of hours worked by each added employee
T = turnover, hiring and training costs per added employee

If the increase in production is to be handled by using N new employees at wage cW, with F fringe costs and T turnover, hiring and training costs per employee, then the additional payroll costs for the firm would be cWM + FN + TN. Garbarino uses the "convenient if dubious assumption" that added workers are paid the same wage rate as present workers, so that $c = 1.0$.[7] Should $c > 1.0$, however, then all employees, both added and present, would have to be paid the higher wage rate, thus increasing the total payroll costs to the firm of hiring additional workers.

---

[6] J.W. Garbarino, "Fringe Benefits and Overtime as Barriers to Expanding Employment," Industrial and Labor Relations Review, 1963/64, Vol. 17, pp. 426-442.

If the increase is to be handled by scheduling overtime for existing workers, then the additional payroll costs for the firm would be aWM + bWM. As long as $cWM + FN + TN < aWM + bWM$, then it would be more profitable for the firm to hire additional workers.[8] Through the appropriate algebraic reductions, this statement condenses to the inequality that new hires will occur whenever $\frac{F}{H} + \frac{T}{H} < (a + b - c)W$.[9]

On the assumption that the overtime rate $a = 1.5$, and that additional workers receive the same wage rate as existing workers, making $c = 1.0$, then the inequality simply states the following: overtime will be scheduled by the firm whenever the sum of the average hourly fringe costs and the average hourly turnover costs of adding more workers is more than half the hourly wage plus the other costs of working overtime. If the overtime option proves to be the most attractive for a firm, then a seasonal increase in the demand for labor will not be translated into an increase in employment for the firm. If, however, fringe benefit and turnover costs are smaller than overtime costs, so that, $\frac{F}{H} + \frac{T}{H} < (a + b - c)W$, then the profit-maximizing firm should always hire more employees to meet a seasonal increase in the demand for labor.

---

[7] Ibid., p. 434.

[8] On the assumption that c might be larger than 1.0, then existing employees would have to be paid a higher wage rate not only for their standard work week, but also for their overtime hours. This would change the inequality so that more workers would be hired whenever $cWM + FN + TN < aWM + bWM + W(c-1)H_1 + aW(c - 1)M$ where H_1 = number of hours of regular time. When $c = 1.0$, both of the added expressions collapse to zero.

[9] This is done as follows:

(a) $FN + TN > (a + b - c)WM$

(b) Since $N = \frac{M}{H}$

(c) $\frac{FM}{H} + \frac{TM}{H} > (a + b - c)WM$

(d) $\frac{F}{H} + \frac{T}{H} > (a + b - c)W$

More specifically, the chances that additional workers will be hired, or that the seasonality in employment will be increased, occurs if:

(a) F and T become smaller

(b) H becomes larger

(c) W becomes larger

(d) a and b become larger

(e) c becomes smaller

For the period of his study, Garbarino found not only that overtime costs were higher for U.S. manufacturing industries, but also that overtime hours were constant over time, and not correlated with such variables as the length of the standard work week, production fluctuations nor manufacturing capacity rates.[10]

---

[10] MacDonald states that Garbarino's findings were so because he ignored turnover costs. Using turnover costs from Ford Motor Company data, MacDonald shows that it can be less expensive to work overtime in some instances. See R.M. MacDonald, "The Fringe Barrier Hypothesis and Overtime Behavior," Industrial and Labor Relations Review, Vol. 19, 1966, pp. 562-569.

Suppose, however, that the firm is not a goods producer, but is instead part of the service industry. In this case, it is not possible for the firm to accumulate inventories in the off-season as services are not storable. Therefore, a demand shift in this perfectly competitive industry is more likely to result in a shift in demand in the factor market. However such factors as the geographical location of the service firm and the policy it observes will also influence its handling of a seasonal increase in demand. For example, consider two firms offering secretarial services, one located in Edmonton, the other in Red Deer, both faced with a seasonal increase in demand. In either case, each firm has the option of not choosing to meet the seasonal increase. Should they decide to meet the increase, however, this can be done by scheduling overtime hours for their existing workers. Or the firms can decide to hire additional staff to meet the seasonal increase in demand, depending upon the costs involved in each option. If the demand increase is sufficiently large and the firm wishes to take on the additional work, but chooses not to schedule more overtime hours for its existing workers nor to hire additional workers, then the geographical location of the firm becomes important. The Edmonton firm may have a better chance of contracting out this additional work than its counterpart in Red Deer, because of the presence of more firms in the market. For this reason, it would be expected that there would be more seasonality in employment in a large city such as Edmonton, than in a smaller center such as Red Deer.

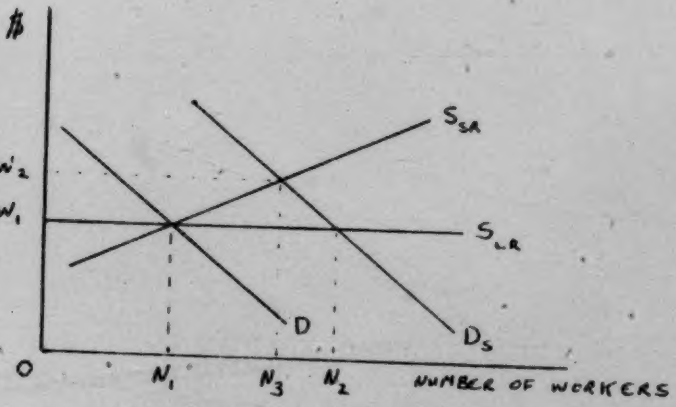
Depending on the assumptions made about the behavior of a goods or service-producing firm, seasonal shifts in demand will be translated back in varying degrees to the factor market. In the short run, a perfectly competitive industry has the option of purchasing more units of labor to meet an increased demand. The more elastic its supply curve, the greater its increase in production corresponding to a demand shift, and the greater its need for additional units of labor. A goods producing industry always has the option of selling from accumulated inventory. A service industry has no such option. It may have to acquire additional labor resources from the factor market if it decides to meet a demand increase.

Factor Markets

If a seasonal shift in demand in the product market results in a corresponding demand shift in the factor market, what happens - if anything - to wages and employment? If it is assumed that the industry faces a long run labor supply curve the following occurs:

FIGURE 1

PERFECTLY COMPETITIVE LABOR MARKET



With a shift in the demand curve from D to D_s an increase in employment of $N_2 - N_1$ is observed. Once the transitory demand shifts have passed, the demand curve moves back to D_1 with wage rate W_1 and employment N_1. Thus in a perfectly competitive labor market, a seasonal shift in demand is easily absorbed with but a change in the number of workers employed.

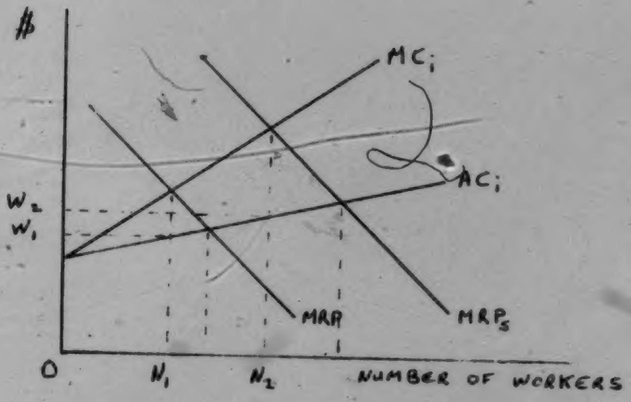
Even in a perfectly competitive labor market the industry may face a labor supply curve which is less than perfectly elastic. An individual firm by itself may face an infinitely elastic supply curve. Nevertheless, should the industry as a whole attempt to bid for more factors of production, a degree of inelasticity will no doubt make itself evident in the short run labor supply curve. In this case the same seasonal shift in the demand curve to D_s will result in increased employment by the amount of $N_3 - N_1$. But this additional employment can only be gained by increasing the wage rate from W_1 to W_2. In order to obtain more units of labor, employers must now offer extra monetary incentives to obtain the resources they desire. However, if the higher wages result in the fact that $\frac{F}{H} + \frac{T}{H} > (a + b - c)W$, then firms are likely to schedule relatively more overtime for their existing workers in place of hiring additional workers. If this happens, the increase of seasonality in employment will be smaller than otherwise. For a given seasonal shift in the demand curve, however, more seasonality in employment will result the greater the elasticity of the labor supply curve.

When the firm is the only buyer of labor in the factor market, it is termed a monopsonist. The identifying feature of a monopsonist is that increased purchase of labor can only be made at successively higher prices. Therefore the AC_i curve will have a positive slope and represent the supply curve for the monopsonist. In this case, the VMP and MRP curves are the same because the firm is assumed to be selling in a perfectly competitive market. However, VMP > MRP had the firm been selling as a monopolist. Both the AC_i and MC_i curves are seen to have positive slopes and the firm will buy N_1 units of labor at price W_1.

A seasonal increase in demand in the product market may also be translated into an increased demand in the monopsonist's labor market.

FIGURE 2

MONOPSONIST'S LABOR MARKET



The MRP_s curve is seen to shift in Figure 2 because of seasonal changes. This brings about increased employment of $N_2 - N_1$ and an increase in the wage rate of $W_2 - W_1$.[11]

Labor as a Quasi-Fixed Factor

One of the theories that purports to offer new insights into the short run stability of employment is Oi's concept of labor as a quasi-fixed factor of production.[12] Oi defines a quasi-fixed factor of production as one whose total employment cost is partially variable and partially fixed. Labor costs to the firm are seen in this dual role. On the one hand, there are wages paid by the firm to its workers which are a variable cost. On the other, there are fixed costs incurred by the firm in hiring its factors of production. Because the latter are an "investment" by the firm in its workers, an element of capital is seen to be embodied in these factors of production. This means that decisions on the use of labor by a firm are no longer based on the current relationship between wage rates and the marginal value products. The future value of these quantities must now be taken into account.

---

[11] Throughout the previous models it has been assumed that a seasonal shift in the demand curve for labor has been parallel to the original. Suppose, however, that elasticity of the demand curve changed with a seasonal shift. What would happen then? If facing an upward sloping supply curve, a shift to a more elastic labor demand curve could result in more employment and a higher seasonal premium being paid, than if the shift was merely parallel to the original. Should the new demand curve prove to be more inelastic than the original, the same conclusion could be reached. The exception would occur if the new demand curve intersected the supply curve at the same point as before - which would in effect constitute no change in employment or wage rate at all. Therefore whether or not the seasonal demand curve for labor changes elasticity from the original is really of little concern.

[12] W.Y. Oi, "Labor as a Quasi-Fixed Factor," Journal of Political Economy, Vol. 70, 1962, pp. 538-555.

The fixed employment costs of hiring a worker can be broken down into hiring costs and training costs. Hiring costs are assumed to have no effect on a worker's productivity and include such things as the costs of recruitment and the costs of entering the worker in various health and pension plans. Training expenses are made to improve the worker's productivity. The effect of such a program is seen in the increment to a worker's marginal value product as the result of these expenditures. The total discounted cost, C, of hiring an extra worker is, therefore, $C = \sum_{t=0}^{T} \frac{W_t}{(1+r)^t} + H + K$

where,

T = expected period of employment

W_t = expected wage in period t

r = discount rate

H = hiring cost

K = training cost

The total discounted revenue, Y, expected from an additional worker is,

$$Y = \sum_{t=0}^{T} \frac{M_t + \Delta M_t}{(1+r)^t}$$

where,

M_t = marginal product without training

M_t = increment due to training

The firm's profits are maximized when C = Y, or:

$$\sum_{t=0}^{T} \frac{W_t}{(1+r)^t} + H + K = \sum_{t=0}^{T} \frac{M_t + \Delta M_t}{(1+r)^t}$$

or,

$$H + K = \sum_{t=0}^{T} \frac{M_t + \Delta M_t - W_t}{(1+r)^t}$$

In effect, as long as a firm incurs any fixed costs of employment then in equilibrium the value of the worker's marginal product must be larger than the sum of the wage rate and the fixed costs, or $C \leq Y$. The fixed costs of employment act as a buffer between the wage rate and the total marginal value product of the worker. In other words, the worker is being paid less than the value of his marginal product in order to amortize the fixed employment costs over his expected period of employment, with a rate of return of r. Oi terms this buffer the periodic rent, and defines the degree of fixity as the ratio of $H + T$ to the present value of all costs. A value of one for the degree of fixity corresponds to a completely fixed factor, while a value of zero, a completely variable factor.

If the firm is suddenly faced with a seasonal decline in the demand for labor, the decision to lay off workers is made on the basis of the current relationship between the worker's wage rate and his marginal product. Fixed employment costs do not enter the decision as these were encountered in prior periods and are considered sunk costs. Therefore, a seasonal decline in the demand for labor will result in workers being discharged whenever $W > MP$. This condition holds in both the short run and the long run for a completely variable factor. However, for a quasi-fixed factor of production, or one with a high degree of fixity, this will not be the case. The worker has been paid a wage rate less than the value of his marginal product in order to amoritze his fixed employment costs. The size of this buffer will be greater for factors of production with a high degree of fixity, implying that a larger decline in product prices will be needed in order to equate the value of the worker's marginal product with his wage rate. Thus for a given seasonal decline in the demand for labor, a quasi-fixed factor is less likely to be laid off than a completely variable factor.

For a given seasonal increase in the demand for labor more workers will be hired as long as the expected value of their total marginal product exceeds that of the wage rate and the fixed employment costs, namely, $C \leq Y$. However, it is even possible that $W > M_t + \Delta M_t$ for a short period of time. The firm may find that the fixed costs of employment are so great, that it will absorb losses for a short period of time to prevent from incurring these costs again. Thus for a seasonal increase in the demand for labor, a factor of production with a large element of fixed costs is unlikely to be hired unless the value of his marginal product meets both the expected value of his wage rate plus his fixed employment costs.

Oi recognized the problem that would exist in testing his theory with the paucity of data available. In his work with data from the International Harvester Company he showed that the covariance $(H + T, W) > 0$. High wage, highly skilled jobs appear to be associated with high degrees of fixity.

Applying the same criterion to Canadian occupational wage data, it would be expected that seasonal flows in employment would be found to be smaller for higher wage occupations than for low. In other words, those occupations with a higher degree of fixity should experience smaller seasonal factors. On this basis, it can be seen from Table 2 that seasonal flows would be expected to be smaller within an industry for such occupations as medicine, dentistry, law, architecture, teaching and managerial professionals. Following Oi's reasoning a priori it would also be expected that larger labor fluctuations would be found

TABLE 2

AVERAGE MALE INCOME BY OCCUPATION, 1970

Occupation	Canada	Alberta
All	$ 6,574	$ 6,461
Farmers	3,699	4,709
Forestry	4,543	6,417
Fishing, Trapping	7,131	1,809
Mines	10,322	7,284
Product Fabricating	6,402	6,459
Construction	6,175	6,567
Utilities Equipment	10,025	8,516
Electronic Equipment	7,652	7,011
Sales Occupations - Commodities	7,120	6,805
Sales Occupations - Services	9,205	9,054
Teaching	9,014	8,956
Physicians	26,990	28,715
Dentists	21,688	23,942
Religion	4,737	4,796
Recreation	4,040	4,572
Architects, Engineers	11,237	10,880
Accountants	9,988	9,897
Lawyers	19,850	20,408
Personal Services:	4,406	4,488
Food and Beverage	6,528	4,634
Lodging and Accommodation	6,027	6,157
Officials, Administrators in Government	10,228	9,048

Source: Statistics Canada, Income of Individuals, Catalogue Nos. 94-765 and 94-766, Ottawa: Industry, Trade and Commerce, 1971.

within an industry for the forestry, construction and product fabricating occupations, as well as for the recreation service, personal service and lodging and accommodation service occupations. To test this assumption rigorously, the values of Table 2 must be adjusted to an hourly basis and only those occupational differences within an industry tested. These adjustments will be made in subsequent chapters. And since the seasonal factors for an industry employment time series will be derived from the X-11, the meaningful comparison will occur between industry seasonal factors and a calculated industry average hourly wage rate. Once these wage rates are derived and the industry seasonal factors calculated, a linear correlation coefficient will be used to measure the degree of association between the two variables. It must be remembered that this is a measure of association only, and not causality. Seasonal movements in the factor market must have been postulated to be due to product market demand shifts and wage rates paid to factors of production. However, because of a lack of data, it is only possible to test the latter at this time. The results of these tests will be presented in Chapters 3, 4 and 5.

In keeping with Oi's theory, it is expected that the linear correlation coefficients will be negative, namely that large industry seasonal fluctuations in employment will be associated with low industry wage rates. To the extent that the service industries have wage rates greater or smaller than other industries in Canada and Alberta, it is expected to be found that their seasonal volatility of employment will vary accordingly.

Transfer Payments

It is quite possible that the existence of a generous unemployment benefit scheme may increase the supply of workers to seasonal industries as workers seek employment for the duration of the statutory qualification period. In other words, generous unemployment benefits may result in seasonality in employment being increased. As a result of this increase in supply, wages in the industry may fall. This in turn implies that the wages paid by the industry will not be high enough to compensate the worker for his expected period of unemployment.

Workers in highly seasonal industries rely heavily on unemployment insurance benefits. The Economic Council of Canada estimates that about half of the workers receiving unemployment benefits had worked steadily for less than six months, and two-thirds for less than twelve months prior to applying for benefits.[13] Up to two-thirds of prior wages to a maximum of $133 per week can be claimed by those who have been employed at least eight weeks out of the last 52. These benefits are in turn payable up to a period of 51 weeks. More than one-third of the workers drawing unemployment benefits will have a level of income exceeding that guaranteed by their respective provincial minimum wage laws.

Prior to the 1971 revision of Canada's unemployment insurance program, seasonal workers were eligible for special benefits. The chief feature of this program was a reduced number of weeks that a claimant had to work before he was eligible to draw benefits. However, as was generally characteristic of the old program, these seasonal benefits were a banking type arrangement. Claimants could draw only to the amount they and their employers had contributed. In the new unemployment insurance program which took effect in 1971, seasonal workers are not differentiated from others. Provided they have worked the required number of weeks, they are eligible to claim in the same manner as any other unemployed worker and for as long a period of time.

---

[13] Economic Council of Canada, People and Jobs: Summary and Recommendations, Ottawa, 1976, p. 19.

Chiswick, in his study of the influence of a new unemployment benefit scheme for U.S. agriculture workers, stated that seasonal workers undoubtedly expect some unemployment during the off-season.[14] He also felt that the existence of unemployment benefits would discourage many from seeking work during this time of inactivity. In measuring the effect of the new legislation giving U.S. agriculture workers coverage from unemployment insurance as of January, 1975, Chiswick found that the implementation of this program had resulted in an increase of employment during the season of 2.5 percent per month. And as he expected, employment during the off-season was down by 5.5 percent per month. If unemployment benefits approach the wage rates that a worker could earn during the off-season, then there exists a strong incentive for him not to engage in vigorous job search activities.

---

[14] B.R. Chiswick, "The Effect of Unemployment Compensation on a Seasonal Industry: Agriculture," Journal of Political Economy, Vol. 84, 1976, pp. 591-602.

CHAPTER II

QUANTIFYING SEASONAL VARIATIONS

A time series shows the variations of a known quantity, in this case employment in various sectors of the economy, over a period of time. To be useful, it is necessary to decompose an economic time series into its component parts, all of which differ in their frequency of occurrence. To isolate any one component it is necessary that the remainder be filtered out. The primary purpose of seasonally adjusting data is to remove the large seasonal factor from a time series thereby enabling the identification of the underlying cyclical factor. However, as a by-product of seasonal adjustment, the seasonal factor itself is isolated and identified, and it is this factor which is of interest in this project.

The Persons' Model

The basic model used to disaggregate an economic time series is that developed by Persons:[15]

$O = T \cdot C \cdot S \cdot I$

where,

O = original series

T = trend

---

[15] W.M. Persons, "Indices of Business Conditions," Review of Economics and Statistics, January, 1919, pp. 5-107.

C = cyclical factor

S = seasonal factor

I = irregular factor

The cyclical factor consists of cumulative and reversible movements resulting in periods of contraction and expansion, lasting on average three to four years, although the range extends from two to ten years. The trend consists of longer movements, reflecting the general drift of events when cyclical fluctuations are averaged out. As the trend generally has little effect on monthly fluctuations it is usually combined with the cyclical factor in short term forecasting.

The seasonal factor consists of yearly movements that follow a more or less regular pattern year after year. It is this factor that has the largest movement relative to the others on a monthly basis and this is the factor of concern in this project. The irregular factor is the result of random forces, or specific and sporadic causes. For example, strikes, floods, hail storms, wars, riots, political upheavals and sampling errors can all cause disruptions in the underlying cyclical factor of an economic time series. The cyclical, seasonal and irregular factors can be seen in the decomposition of an artificial time series in Figure 3.[16]

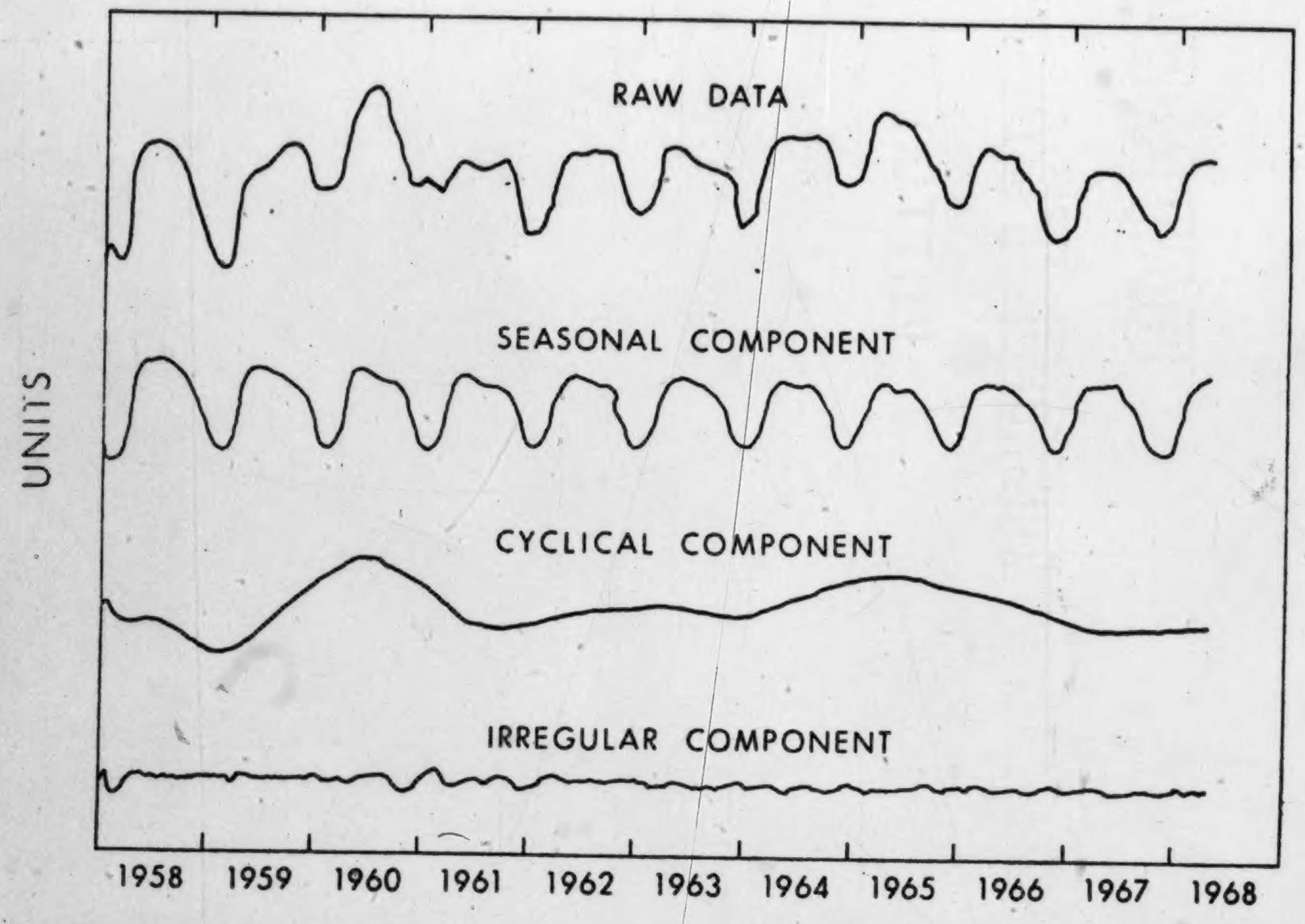
In the Persons' Model, it is assumed that the combined trend-cycle is independent of the remaining two factors. The multiplicative model

---

[16] There are no important economic time series showing only T, C, S or I movements to the exclusion of other factors. See E.B. Dagum, "A Note on the Seasonal Adjustment of Economic Time Series," Canadian Statistical Review, Catalogue No. 11-003, Ottawa: Industry, Trade and Commerce, August, 1974, p. 6.

FIGURE 3

Major Components of an Artificial Time Series



has units attached to the trend-cycle only, the other factors developing as index numbers. This feature allows the seasonal and irregular factors to be compared directly with regard to their relative influence and it also allows for comparison between time series.

The Shiskin Program

The method used in this project for analyzing employment time series is officially called, "The X-11 Variant of the Census Method II Seasonal Adjustment Program."[17] It is an extremely sophisticated computer version of the basic ratio-to-moving average method of seasonal adjustment developed by Macauley in the 1930's.[18] Dr. Julius Shiskin of the United States Bureau of the Census is the author of the X-11 and the latter is often referred to as the Shiskin program.

The X-11 Seasonal Adjustment Program is the latest to be released by the United States Bureau of the Census. The first computer program became operational in 1954 and soon thereafter in 1955 it was replaced by a revised program called Census Method II. Research is ongoing at the Bureau continually to improve the methods of accounting for seasonality. The results of this research are incorporated into programs designated with the letter 'X' and a sequence number. In 1960, the first variant to be made available to the public was called the X-3.

---

[17] J. Shiskin, A. Young, J. Musgrave, The X-11 Variant of the Census Method II Seasonal Adjustment Program, Technical Paper No. 15 (1967 revision), Bureau of the Census, Washington, 1967.

[18] F.R. Macaulay, "The Use of Moving Averages in the Measurement of Seasonal Variations," Journal of the American Statistical Association, September, 1928, pp. 241-52.

The chief difference between it and Method II rested in the method of treating extreme values and computing seasonal factors. In 1961, the X-9 and X-10 variants were made public. The X-9 was designed to handle normal time series, while the X-10 was used to handle series that had more erratic characteristics. The latter calculated an MSR (moving seasonality ratio) which was equal to the average absolute monthly change in the irregular factor divided by the seasonal factor. The value of the MSR was used to select an appropriate moving average to smooth the calculated S-I ratios.

The X-11 variant of Method II became the standard program at the Bureau in 1965. A number of improvements have been made in this the latest version of the original program, two being the most important. The first is the graduated treatment of extreme values. For most time series, a cut-off limit of 2.5 standard deviations has proved satisfactory, but the user may vary this in accordance with the degree to which the series is erratic.

Secondly, the Spencer moving average has been replaced by three possible Henderson moving averages. In the X-11, the moving average used to estimate the cyclical factor from the seasonally adjusted data is selected on the basis of the ratio of the absolute monthly average of the irregular factor to the cyclical, $\overline{I}/\overline{C}$. The moving average selected on this basis compromises the need for damping the irregular factor, while at the same time allowing for the accurate reproduction of fluctuations in the cyclical factor. In previous programs a 15-term Spencer was used regardless of the value of $\overline{I}/\overline{C}$. The weights of the Spencer used in earlier programs were as follows:[19]

$$-\frac{3}{320},\ -\frac{6}{320},\ -\frac{5}{320},\ +\frac{3}{320},\ +\frac{21}{320},\ +\frac{46}{320},\ +\frac{67}{320},$$

$$+\frac{74}{320},\ +\frac{67}{320},\ +\frac{46}{320},\ +\frac{21}{320},\ +\frac{3}{320},\ -\frac{5}{320},\ -\frac{6}{320},\ -\frac{3}{320},$$

The X-11 selects the following Henderson moving averages on the basis of the $\overline{I}/\overline{C}$ ratios:

$\overline{I}/\overline{C}$	Moving Average
0 - .99	9 term Henderson
1.00 - 3.49	13 term Henderson
3.50 +	23 term Henderson

Macaulay states that Henderson based his weights on the following formula, where 2m-3 is the number of terms in the moving average:[20]

$$\frac{315\ ((m-1)^2 - x^2)\ (m^2 - x^2)\ ((m+1)^2 - x^2)\ ((3m^2 - 16)\ 11x^2)^2}{8m\ (m^2 - 1)\ (4m^2 - 1)\ (4m^2 - 9)\ (4m^2 - 25)}$$

For purposes of a comparison, the weights of a 15 term Henderson are as follows:

$$-\frac{2652}{193154},\ -\frac{3732}{193154},\ -\frac{2730}{193154},\ +\frac{3641}{193154},\ +\frac{16016}{193154},\ +\frac{28182}{193154},\ +\frac{37422}{193154},\ +\frac{40860}{193154},$$

$$+\frac{37422}{193154},\ +\frac{28182}{193154},\ +\frac{16016}{193154},\ +\frac{3641}{193154},\ -\frac{2730}{193154},\ -\frac{3732}{193154},\ -\frac{2652}{193154}$$

Both the Spencer and Henderson moving averages developed from attempts by actuaries to develop moving averages which would result in smooth curves from erratic time series data. All of the moving averages so developed used a criterion of smoothness based on the minimization of the sum of squares of third differences of the weights in the respective weight diagrams. On this basis, a 15 term Henderson moving average results in a 12 percent greater smoothing of a time series than a corresponding 15 term Spencer. However, until the advent of the computer, the Spencer moving average enjoyed greater usage because of the relative ease with which it could be calculated as opposed to the rather complex Henderson weight diagram. Needless to say, the total of both weight diagrams equals unity.

---

[19] A 15 term Spencer is calculated by taking a 4 x 4 x 5 moving average of a 5 term moving average weighted -3, +3, +4, +3, -3. The total is divided by 320.

F.R. Macaulay, The Smoothing of Time Series, National Bureau of Economic Research, No. 19, New York, 1931; p. 55.

[20] Ibid., pp. 51-4.

It should be noted that neither the Spencer nor the Henderson moving average by themselves will eliminate seasonal fluctuations from a time series. The Spencer is a 15 term moving average, while the Henderson formula cannot accommodate a 12 term moving average. Therefore neither moving average by itself would eliminate seasonal fluctuations except by sheer chance. However, this apparent disadvantage is easily overcome by including a 12 month centered moving in the calculation scheme. This is in fact the exact procedure used in the X-11 program.

In the simple ratio-to-moving average method of seasonal adjustment the first step consists of computing a centered twelve term moving average of the original data. This average eliminates the seasonal and irregular variations and reproduces the trend. The original data are divided by this moving average and as both contain the cyclical factor, this leaves essentially the seasonal and irregular factors (S-I ratios). Estimates of the seasonal factor are obtained by averaging successive

S-I ratios for each month separately, thereby eliminating the irregular factor. Although the seasonal factors are of prime concern here, a seasonally adjusted series would be obtained by dividing the original series through by the seasonal factor. This would result in a series containing only the cyclical and irregular factor.

The X-11 goes through a series of iterations of this basic procedure, testing and smoothing extreme values of the irregular factor in order to develop better estimates of the various components.[21] Basically, three rounds of calculations are performed by the program. The original data are smoothed using a centered twelve term moving average to provide a preliminary estimate of the cyclical factor. Preliminary S-I ratios, seasonal factors and irregular factors are then calculated using a series of moving averages and graduated weights for extreme values.

The weights developed are based on the variability of the irregular component and each monthly value is tested for extremes. Those values exceeding the upper limit of 2.5 standard deviations are designated as extreme and receive a zero weight. Those values of the irregular factor falling inside 1.5 standard deviations receive full weight. Values falling between the limits receive weights of between 1.0 and 0 depending on their degree of variability. Irregular values receiving less than full weight have their corresponding S-I ratios replaced with modified S-I ratios. A second set of seasonal factors is now calculated.

---

[21] J. Shiskin, A. Young, J. Musgrave, The X-11 Variant of the Census Method II Seasonal Adjustment Program, Technical Paper No. 15 (1967 revision), Bureau of the Census, Washington, 1967, pp. 8-20.

Using these seasonal factors, a first estimate of a seasonally adjusted series is calculated. A second estimate of the cyclical factor is now derived by using one of the three Henderson moving averages contained in the program on the seasonally adjusted series. The computations listed above are then performed again to obtain a second estimate of a seasonally adjusted series and a more refined estimate of the irregular factor. The irregular is again modified for extreme values and an appropriate set of weights is developed.

The second round of the X-11 starts off with the original series modified by the irregular weights calculated in the first round. By and large the same calculations as contained in round one of the program are performed again to yield a second and final estimate of the irregular weights.

In the third round the original series is again modified, this time using the final irregular weights calculated in round two. Again many of the same computations are performed to yield final estimates of the seasonal factors, trend, irregular factors and a seasonally adjusted series. A host of summary measures is also computed by the X-11.

How is it possible to know that the X-11 does what it sets out to do? One test was devised by Shiskin, the other suggested by Salzman. Shiskin constructed a number of artificial time series from the components of various economic time series. Thus he would use a small seasonal factor from one series in conjunction with a cyclical and irregular factor from two other series which showed relatively larger movements. Then he would use a small cyclical together with large seasonal and irregular factor movements. All possible combinations were tried and constructed into hypothetical time series. These were then run through the X-11 program to be decomposed into their respective components. In almost all cases, the estimated component followed the true component faithfully.[22]

Salzman suggests that any series to be examined be run through the X-11 program and a seasonally adjusted series obtained. As a test to determine that the seasonal factor has been identified and removed, the time series should be run a second time through the X-11. If all seasonality has been removed the first time, the seasonal factors in the second run should all be equal to 100. Salzman found this to be the case.[23]

The Shiskin program available from the United States Bureau of the Census was designed to operate on Univac equipment. As the University of Alberta relies primarily on an IBM 360/67 computer, an IBM version of the X-11 was obtained from the Corning Glass Works of Corning, New York. This program is used in this project and is fully compatible with the Shiskin program.[24]

---

[22] J. Shiskin, "Decomposition of Economic Time Series," Science, Vol. 128, 1958, pp. 1543-4.

[23] L. Salzman, Computerized Economic Analysis, McGraw-Hill, New York, 1968, pp. 24-6.

[24] The X-11 enjoys wide acceptance as a seasonal adjustment program. To the exclusion of other methods, it is used by most agencies and departments of the Canadian, American and Western European governments. See Seasonal Adjustment on Electronic Computers, OECD, Paris, 1960.

CHAPTER III

INTER-INDUSTRY COMPARISON: THE SEASONAL VARIABILITY OF TWO ALBERTA SERVICE SECTORS AND OTHER PROVINCIAL INDUSTRIAL SECTORS

The next three chapters of this project will be devoted to the decomposition of various employment time series to determine their seasonal variability as displayed by their relevant S-I ratios and final seasonal factors.

Data: Sources and Methods

To obtain reasonable estimates of the seasonal variability of the various provincial industries analyzed in this chapter, every effort was made to obtain compatible data in the sense that all observations would be either raw employment figures, or index numbers with the same base year. At the time the computer analysis for this project was done, the latest available data were used, namely January, 1961 to December, 1968. Having to deal with a combination of raw employment figures and index numbers proved to be a problem not easily circumvented in Statistics Canada publications.

With respect to this chapter of the research project, it is fortunate that all data for the industrial sectors analyzed here were obtainable from Statistics Canada Publication 72-508, Estimates of Employees by Province and Industry. The figures published in this occasional catalogue are presented in raw data form and not index numbers and the observations have not been seasonally adjusted. The data covered in this publication contain the monthly employment figures for the years 1961 through 1968, inclusive.

Statistics Canada Publication 72-508 is also unique in that it attempts to provide complete coverage of all the establishments within an industrial sector. Unlike the Statistics Canada publication closest to its own format, Publication 72-002, Employment and Average Weekly Wages and Salaries, the latter covers only establishments employing 20 or more people, while Publication 72-508 includes small as well as large firms and for this reason will be used whenever possible.[25] This difference in coverage becomes rather critical when dealing with any of the service industries as many establishments are owner-managed and have but a small number of employees. These firms would be omitted from the monthly Statistics Canada Publication 72-002, but included in Publication 72-508. For example, the 1966 Census of Merchandising and Services clearly reveals that the average size of these firms tend to be on the small side (Table 3).

Why then use Statistics Canada Publication 72-002 at all? It will later become necessary to resort to this catalogue in spite of its limitations, because it contains data which are simply unavailable in Publication 72-508, or any other Statistics Canada publication.

---

[25] 72-002 is taken from the monthly ESI survey which covers all large firms. 72-508 is comprised of both the ES1 and ES2 surveys, the latter being a small firm sample survey. Although the ES2 is collected monthly, it is published only on an occasional basis, unlike the ES1 which is published monthly.

The Alberta Sectors to be Examined

The total labor force is compiled in Publication 72-508 for all provinces as well as for Canada as a whole. The data include employment in all industrial sectors with the exception of employees in agriculture. Also exluded in the coverage, however, are proprietors, directors and firm members (including those actively working in the firm) pensioners, own account workers, unpaid family workers, employees working less than one day a week, employees absent without pay and those persons providing services to an establishment on a contract basis.

TABLE 3

EMPLOYEES PER ESTABLISHMENT, SERVICE TRADES,
ALBERTA AND CANADA, 1966

Service	Alberta	Canada
Recreation	5.1	6.0
Business	8.4	10.3
Personal	3.4	3.2
Repair	2.1	2.4
Hotels, Restaurants, Taverns	8.6	6.8
Retail Trade	5.9	5.2
Miscellaneous	9.1	9.7

Source: Statistics Canada, 1966 Census of Merchandising and Service, Catalogue Nos. 97-602 and 97-647, Ottawa: Industry, Trade and Commerce, 1966.

The primary focal point of this study will be some of the service categories included in the Community, Business and Personal Services, or Standard Industrial Classification 801-899. The reason for this is twofold: firstly, a look at Table 4 confirms that this is the service category accounting for the largest share of Alberta's employment with approximately 25 percent of the labor force in 1971. Secondly, resource constraints dictated that not all of the service categories could be analyzed by the Shiskin program. The Trade sector, however, was also included in the analysis, accounting for 15 percent of the total labor force. This sector is composed of Standard Industrial Classification 600-699, and includes both retail and wholesale establishments.

Two goods producing sectors were also analyzed by the Shiskin program for purposes of direct comparison. A small problem arose here with respect to Standard Industrial Classification 500-579, the Transportation, Communications and Public Utilities sector. In some industrial classifications this sector has been referred to as a goods producing sector, while in others as a service sector. Following the work of Fuchs, this project will utilize the former classification. As Fuchs explains:

> The most questionable decision was to place transportation, communications, and public utilities in the Industry sector because of their dependence upon heavy capital equipment and complex technology. Fortunately, investigation revealed that the major conclusions of this study would not be altered significantly if these industries had been classified in the Service sector.[26]

The other goods producing sector to be analyzed in this project is that included in Standard Industrial Classification numbers 100-399, or Manufacturing, which includes the manufacture of both durable and non-durable goods. In 1971, this sector accounted for approximately 9

---

[26] V.R. Fuchs. The Service Economy, National Bureau of Economic Research, New York, 1968, pp. 16-17.

TABLE 4

TOTAL LABOR FORCE, ALBERTA, 1951 AND 1971

	Number of Employees		Share of Labor Force	
	'000		percent	
	1951	1971	1951	1971
Agriculture	114.8	86.7	32.5	12.6
Industry	102.3	199.0	28.9	28.9
Service	134.0	351.4	37.9	51.1
Total Labor Force[1]	353.5	688.3	100.0	100.0
Industry				
Forestry, Fishing	2.7	2.3	.8	.3
Mining	12.8	26.6	3.6	3.9
Manufacturing	28.8	62.4	8.1	9.1
Construction	23.7	52.4	6.7	7.6
Transportation, Communication, Utilities	34.3	55.3	9.7	8.0
Service				
Trade	52.2	104.2	14.8	15.1
Finance, Insurance, Real Estate	8.0	25.3	2.3	3.7
Community, Business and Personal Services	53.7	168.5	15.2	24.5
Public Administration, Defence	20.1	53.4	5.7	7.8

[1] Also includes Unspecified or Undefined Industries.

Source: Census User Summary Tapes, Statistics Canada, Ottawa.

percent of Alberta's labor force while Transportation, Communication and Public Utilities accounted for about 8 percent of the province's employment.

Stable and Moving Seasonal Factors

Before the results of the X-11 analysis of the various Alberta sectors are examined, a word should be said about the behavior of seasonal factors over time. A satisfactory adjustment for seasonal variation must allow for moving seasonality. This does not imply that the seasonal factors for a given economic time series are in fact changing, but merely that allowance must be made in case such a shift does make itself evident. For most economic series changes in the relative importance of components takes place very slowly, a direct reflection of the fact that changes in socio-economic institutions and social customs also take place very slowly. Therefore, most changes in seasonal factors tend to be minor, with but small changes in slope and very few changes in direction. However, it is not unreasonable to expect changes in the seasonal factors of some services for the simple reason that such various things as summer holidays are increasing in length, and that consumer expenditures may be becoming more or less concentrated around the traditional buying seasons of Christmas and Easter.

Stable seasonal factors are defined as the mean value of the S-I ratios for each month. They are termed stable because they are calculated only once for the data under observation. The computation of stable seasonal factors is justified when there is reason to believe that the population parameters from which the sample is drawn are stable over time. Therefore the assumption of fixed seasonal factors implies the assumption of fixed structural relations. The simple ratio-to-moving average-technique developed by Macauley and the dummy variable regression method both result in the calculation of stable seasonal factors. Any deviation in the S-I ratios calculated for each month by either of these methods is assumed to be due to the irregular factor.

One of the most important features of the X-11 is that it incorporates a technique for dealing with gradual changes through time in the amplitude and pattern of the seasonal factor, in other words, it calculates moving seasonal factors if these are warranted. Moving seasonality may be time conditioned or trend conditioned. In time conditioned moving seasonality, seasonal factors are observed to change due to the impact of changing economic, social and institutional parameters. In trend conditioned moving seasonality, seasonal factors are considered to be determined by the level of the trend at a given moment. It is especially important to be aware of changes in the seasonal factor if the latter is to be extrapolated after the period under observation.

The X-11 program works under the assumption of moving time conditioned seasonality. The dummy regression method, although it calculates stable seasonal factors, results in trend conditioned seasonality. At the present time there exists no simple method of taking both time conditioned seasonality and trend conditioned seasonality into account.[27]

---

[27] See Summary Report of the Meeting, Seasonal Adjustment on Electronic Computers, OECD, Paris, 1960, p. 22.

The primary difference between the regression method and the X-11 other than the type of seasonal factors calculated by the respective methods, is that in one the irregular factor is eliminated by the minimization of squares, while in the other this is done through the use of moving averages.

In running the various employment series used in this project through the X-11, it must be determined whether or not the seasonal factors show any evidence of moving or stable seasonality and whether or not these are to be considered to have trend conditioned or time conditioned causality. Early Canadian economic time series were considered to have stable seasonal factors. Seasonal factors were calculated for the period 1929-1937 and were considered to be representative of the seasonal factors for all series up to the year 1950.[28]

The fact that stable seasonal factors were calculated at this time is understandable due to the fact that the procedure involved many laborious manual calculations. With the advent of computers and relevant statistical programs, seasonal factors for any time series are quickly calculated and it is possible to observe their movement over time.

Daly has shown that the assumption of stable seasonal factors may not be appropriate for some Canadian economic time series. Calculating seasonal factors for the period 1946-1959, movements in the amplitude of seasonal factors were shown to exist in the production of the electric power, automobile, cement and roofing paper industries of

---

[28] D.J. Daly, "Canadian Experience with Seasonal Adjustment," Seasonal Adjustment on Electronic Computers, OECD, Paris, 1960, p. 161.

Canada.[29] Daly attributed this movement due to the large increases in demand relative to capacity for these industries. Demand was so strong in this period that output was pushed in the off-season in spite of the increased costs to the industries involved. Thus historical experience has shown that changes in seasonal factors have occurred and allowance must be made for the fact that they could also occur in the series examined in this project.

Kuznets found in his study of the United States' economy that the seasonal factors of some employment series did exhibit change over time.[30] For industries where the demand for a given commodity was fairly constant, the seasonal factor was observed to decline, or at least remain constant over time. For industries involved in the production of durable or seasonal commodities, the employment seasonal factors were shown to have increases in their amplitudes over time.

The fact that seasonal factors may change is not surprising. Although the effect of weather is fairly constant over the years, factors such as shifts in an economy's center of production, technical progress or change in consumers' spending patterns may impose themselves on the pattern displayed by a seasonal factor. If changes occur in the amplitude of a seasonal factor, the strain on an economy's factors of production increases. It is evident that more capital and labor resources and raw material inputs are required if an industry is to produce at higher seasonal peaks.

---

[29] Ibid., p. 157.

[30] S. Kuznets, Seasonal Variations in Industry and Trade, National Bureau of Economic Research, New York, 1933, Chapter 11.

The Seasonal Factors of the Alberta Sectors

At this point it becomes appropriate to look at the seasonal factors for the individual Alberta sectors as calculated by the X-11. These are contained in Figures 4 to 8. The final seasonal factor values as calculated for each series are shown as small circles and are obtained from Table D10 of the computer printout. The final seasonal factors are derived from the third iteration of the X-11 program and are basically the final modified S-I ratios smoothed by a weighted 5 term (3 x 3) moving average.

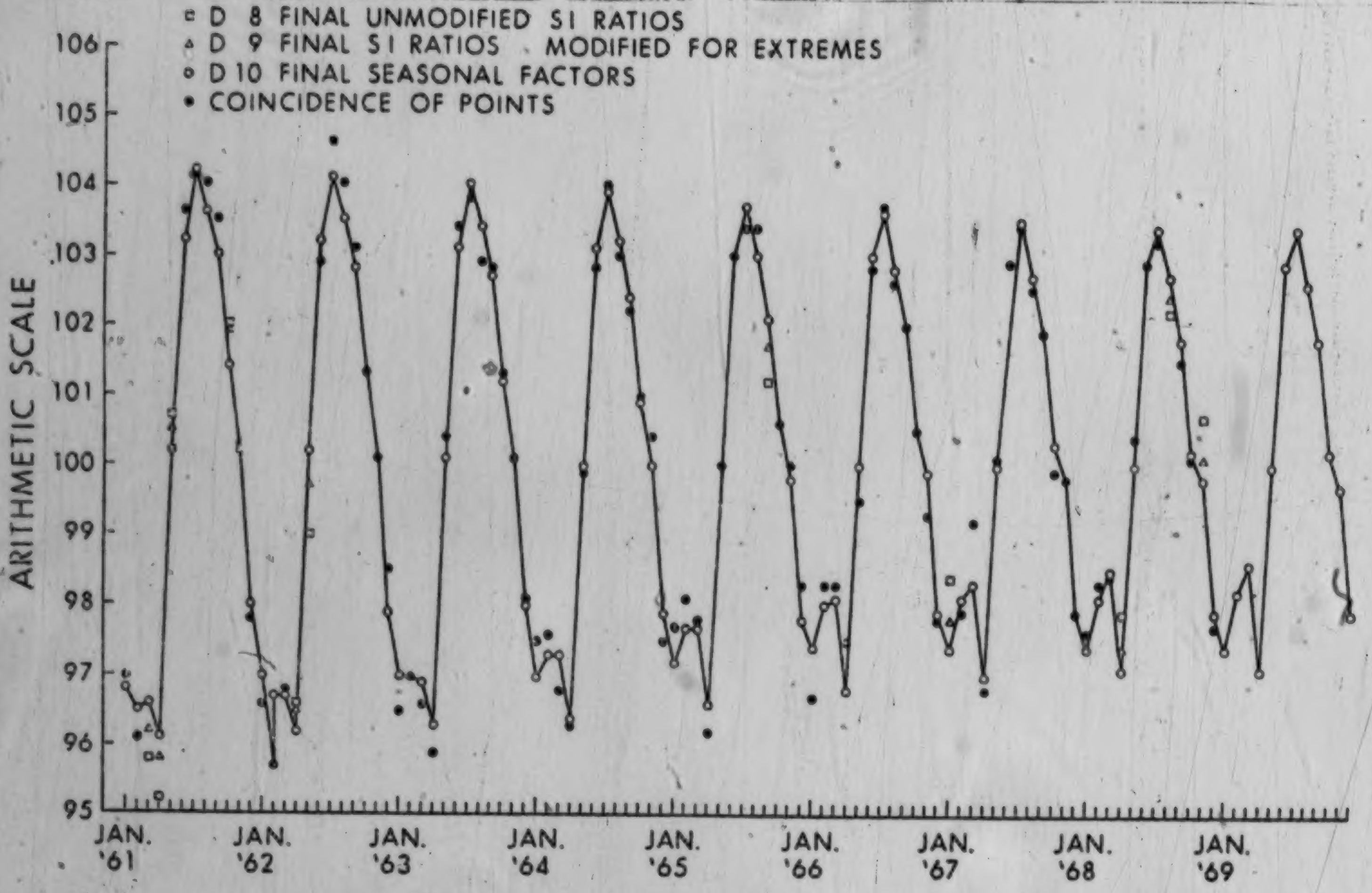
The small triangles on each chart represent the final S-I ratios modified for extreme values of the irregular factor. These are obtained from Table D9 of the X-11 printout. The values for these S-I ratios are obtained from the third iteration of the X-11 by dividing a Henderson derived cyclical into the original series modified by the final weights assigned to the irregular factor.

The small squares on the charts represent the final S-I ratios not modified for extreme values of the irregular factor. This information is obtained from Table D8 of the X-11 printout. These S-I ratios are obtained by dividing a Henderson derived cyclical obtained from the third round calculations into the original time series.

Two things should be noted here. Firstly, the degree to which the final seasonal factors were modified for extreme values is shown by the location of the S-I ratios away from the final seasonal factor values which are all connected by straight lines. Secondly, all of the final values of the S-I ratios and seasonal factors are presented as index numbers because of the multiplicative relationship of the model.

FIGURE 4

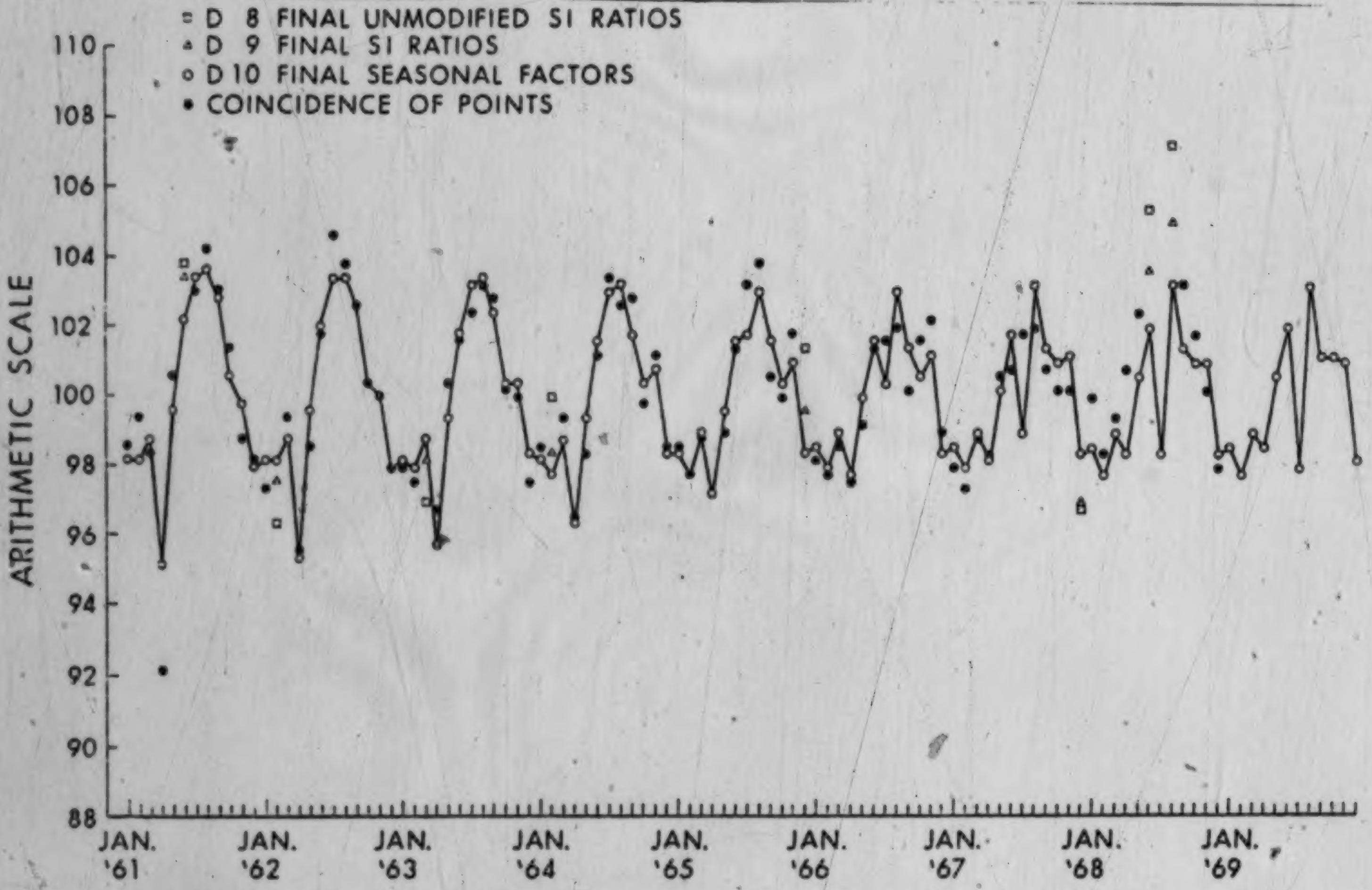
Seasonal Factors, Non-agricultural Labor Force, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

FIGURE 5

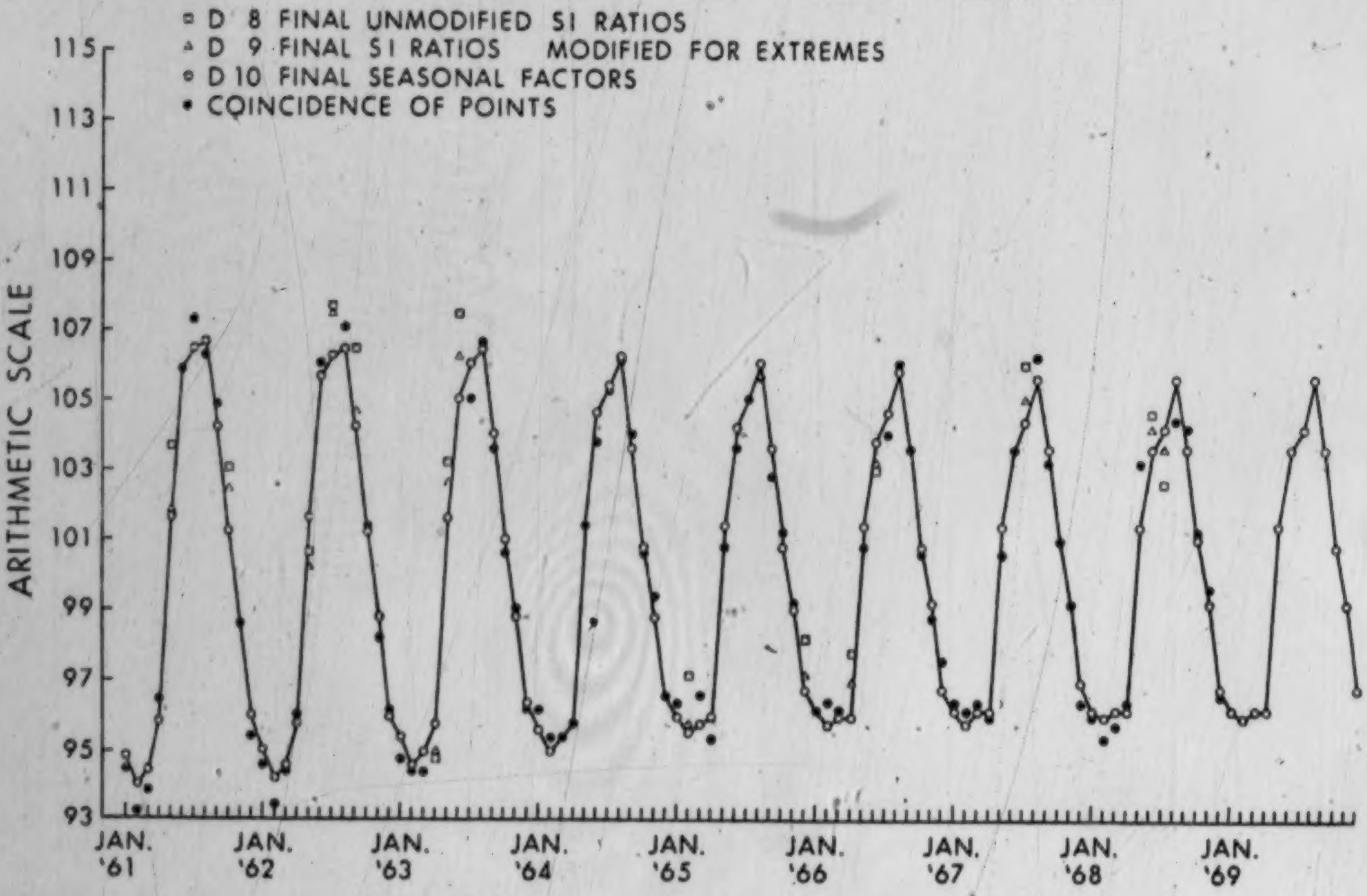
Seasonal Factors, Manufacturing, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

FIGURE 6

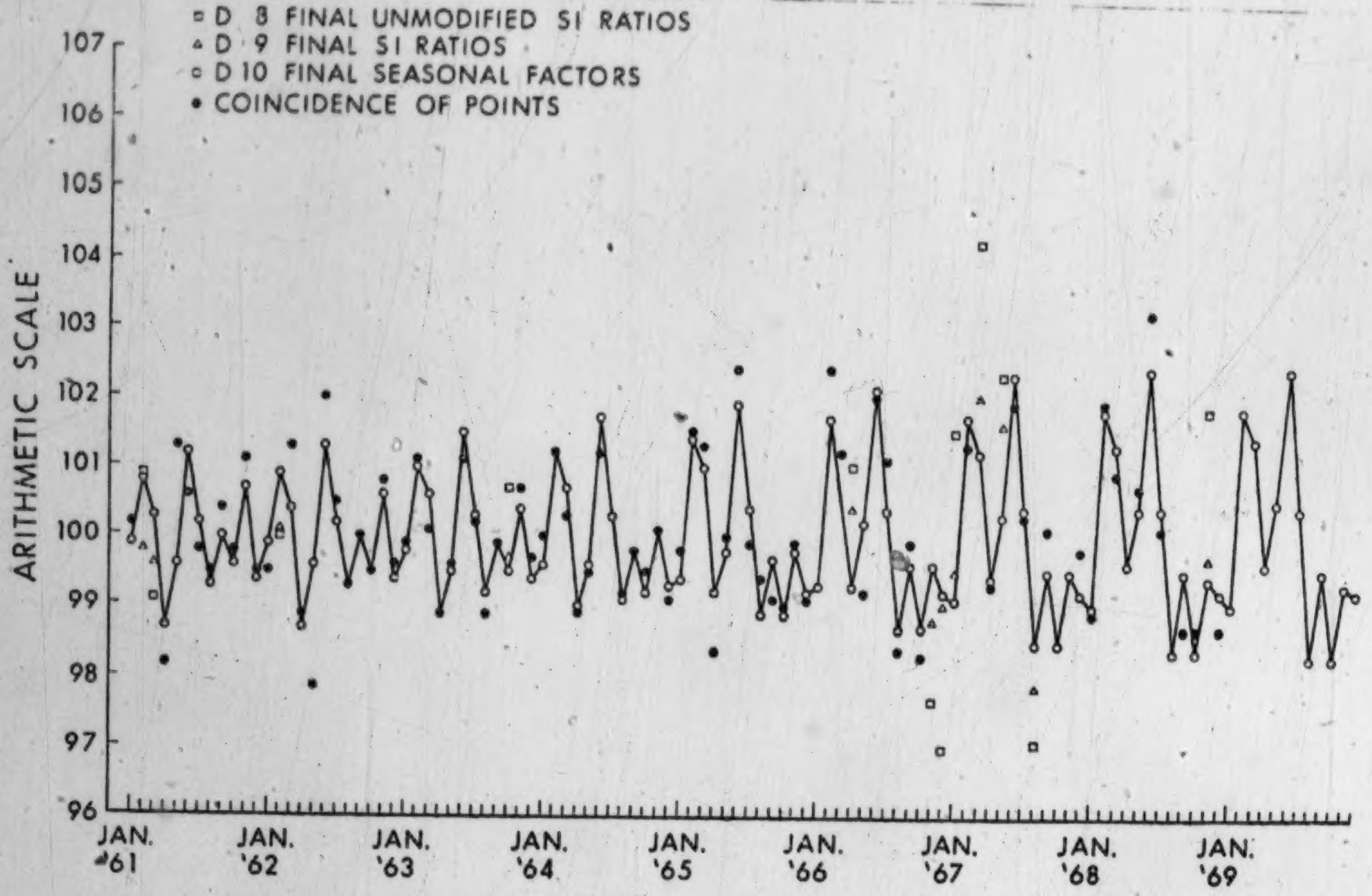
Seasonal Factors, Transportation, Communication and Utilities, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

FIGURE 7

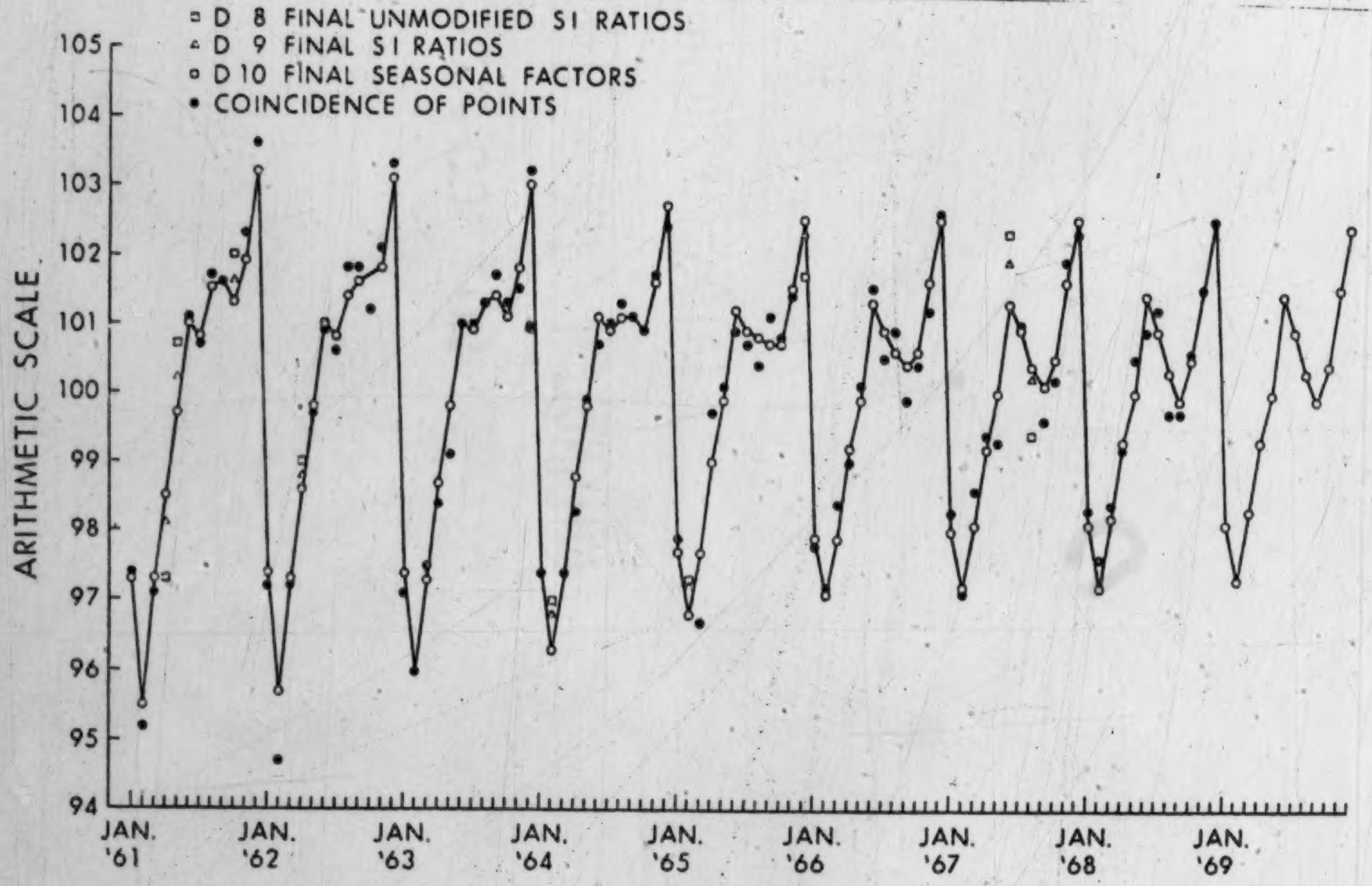
Seasonal Factors, Community, Business and Personal Services, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969

FIGURE 8

Seasonal Factors, Trade, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969

Table 5 indicates the mean and standard deviation of the value of the average seasonal factor from the mean. Smaller values of the standard deviations, such as that of the Community, Business and Personal Services sector, indicate smaller amplitudes contained in the seasonal factor, or smaller seasonal swings in the employment series.

TABLE 5

STANDARD DEVIATION OF AVERAGE SEASONAL FACTORS
FROM THE MEAN, ALBERTA SECTORS, 1961-1968

	Standard Deviation	Mean
Total Non-agricultural Alberta Labor Force	2.6	100.0
Manufacturing	2.0	100.0
Transportation, Communication	4.1	100.0
Trade	1.9	100.0
Community, Business, Personal Services	1.0	100.0

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

Table 6 would indicate that the seasonal factors for the total non-agricultural labor force of Alberta are decreasing in amplitude over time. The range of the factor in the year 1961 was 96.1 to 104.2, while in 1969 it was projected to be 97.1 to 103.4.[31] The Manufacturing sector of Alberta has the third largest measure of dispersion with the average value of its seasonal factor having a standard deviation of 2.0. The range for the year 1961 of the seasonal factor was 95.2 to 103.5, while the projected factors for 1969 were expected to be 97.9 to 103.2. Therefore, it would appear at first glance that the seasonal factors for the Manufacturing sector are decreasing slightly in amplitude over time. While the seasonal factor peaks reached around August of every year remain at about the same value over the duration of the study, it can be seen that the troughs of the seasonal factor are decreasing in amplitude.

---

[31] Estimates of seasonal factors for one year ahead in the Shiskin program are based on the work of W.A. Beckett of the Canadian Department of Industry, Trade and Commerce. Projections are based on: $S_{n+1} = S_n + 1/2 (S_n - S_{n-1})$

J. Shiskin, Electronic Computers and Business Indicators, National Bureau of Economic Research, Occasional Paper No. 57, New York, 1957, p. 11.

TABLE 6

RANGE OF SEASONAL FACTORS, ALBERTA SECTORS, 1961-1969

	1961	1969*
Total Non-agricultural Alberta Labor Force	96.1-104.2	97.1-103.4
Manufacturing	95.2-103.5	97.9-103.2
Transportation, Communication	94.0-106.5	95.9-105.5
Trade	95.5-101.9	97.3-102.4
Community, Business, Personal Services	98.7-101.2	98.3-102.4

*Projected.

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

Transportation, Communication and Public Utilities have the greatest dispersion of the sectors examined with a standard deviation of 4.1. However, there appears to be little change in the range of the seasonal factor over time. For the year 1961 this was calculated to be 94.0 to 106.5, while the estimated factors for 1969 ranged from 95.9 to 105.5. As is the case with the Manufacturing sector, Transportation and Communication has peaks to appear to achieve the same amplitude around the month of August every year, while the troughs of the factors appear to be becoming progressively smaller in amplitude.

TABLE 7

MONTH OF EXTREME AMPLITUDE OF SEASONAL FACTORS, ALBERTA SECTORS, 1961-1968

	Crest	Trough
Total Non-agricultural Alberta Labor Force	July	April
Manufacturing	August	February, April
Transportation, Communication	June, August	February
Trade	December	February
Community, Business, Personal Services	June	August, October

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

The Trade sector, which includes both wholesale and retail establishments, has a seasonal factor with the second smallest distribution about the mean with a standard deviation of 1.9. Again, the seasonal swings displayed are similar to those of Manufacturing and Transportation, in that the amplitude of the troughs of the seasonal factors are becoming more shallow while the peaks achieve roughly the same annual values. Thus the range for 1961 was 95.5 to 101.9 while the projected values for 1969 were expected to be 97.3 to 102.4.

The behavior of the seasonal factors for the Trade sector is somewhat different, however, from that of previously described Alberta sectors. While all series have been shown to reach maximum values of their seasonal factors during the summer months, the Trade seasonal factor reaches its maximum amplitude during the winter month of December. This is not altogether unexpected, the additional staff taken on by trade outlets for the Christmas buying season resulting in large seasonal fluctuations in employment. The annual low value of the seasonal factor falls in line with the other economic series examined, usually occurring in the first few months of the year.

The seasonal factors for the Community, Business and Personal Services would appear to be characterized by amplitudes which are becoming larger over time. The range in 1961 was 98.7 to 101.2, but by 1969 this was expected to be 98.3 to 102.4. Nevertheless, the average value for the seasonal factor is closely bound about the mean with a standard deviation of only 1.0. This implies a fairly constant range for the seasonal factor over time. That is, it would appear that the service industries included in Standard Industrial Classification 801-899 are least affected by seasonal fluctuations in comparison with the other Alberta sectors examined.

The seasonal factor for the Community, Business and Personal Services reaches its maximum amplitude about June of every year, with a smaller peak occurring in February. The seasonal factor would also appear to be reaching a double factor low, around August and October of each year.

How significant in the foregoing is the apparent movement demonstrated in some of the seasonal factors? Is it sufficient to conclude that in fact the seasonal factors are exhibiting moving seasonality, or can they be considered to be stable over time?

F-Test

If a time series has no seasonal component, then the S-I ratios will tend to average one (or 100 in index form), that is, the mean of the S-I's calculated for any given month will tend to equal one. There will be differences observed in the mean S-I's calculated for the various months due to the influence of the irregular factor, but none of these movements will be significantly different from one. Those means differing significantly from one provide evidence of the existence of stable seasonality.

To test for stable seasonality it is possible to measure the statistical significance among the computed mean S-I ratios for each month. A one-way analysis of variance F-test is applied to the final unmodified S-I ratios of Table D8 in the X-11 printout.[32] The F-test tests the hypothesis that $H_m : \hat{SI}_1 = \hat{SI}_2 = \ldots \hat{SI}_{12} = \hat{\hat{SI}}$

where, $\hat{SI}_j$ = monthly means of S-I ratios

$\hat{\hat{SI}}$ = grand mean of all S-I ratios

against the alternative that the SI_j are not all equal. The F value is computed from $F = \sigma^2_m / \sigma^2_R$

---

[32] J. Shiskin, A. Young, J. Musgrave, The X-11 Variant of the Census Method II Seasonal Adjustment Program, Technical Paper No. 15 (1967 revision) Bureau of the Census, Washington, 1967, p. 59.

$$\text{where, } \sigma^2_m = \frac{1}{11} \sum_{1}^{12} Nj\,(\hat{SI}_j - \hat{\hat{SI}})^2 \text{ (between months variance)}$$

$$\sigma^2_R = \frac{1}{N-12} \sum_{1}^{12} \sum_{1}^{Nj} (SI_{ij} - \hat{SI}_j)^2 \text{ (residual variance)}$$

The degrees of freedom attached to σ^2_m is always 11, while that for σ^2_R is equal to N-12. However, in the case of the latter the Shiskin program automatically assumes a 10 year series is run, testing against an F value at the 1 percent level of significance of 2.41. The reason for doing this, according to Shiskin, is that differences in computed F values for series of different lengths are miniscule. The exact F value for series of the length used in this project is 2.48 at the 1 percent level.

It should be pointed out that although the X-11 is capable of handling moving seasonal factors, this does not mean that they exist in any specific time series. If in fact the seasonal factors calculated by the program are found to be stable over time as a result of applying the F-test, the following message is printed out by the program: 'Stable Seasonality Present at the 1 Percent Level.' The advantage of this statistical procedure is that it allows for the rigorous testing of what could only be hypothesized before. It is probably fair to conclude that if stable seasonal factors are evident in any of the employment series under investigation, then factors giving rise to such changes over time such as socio-economic institutions and social customs have in fact remained constant. In other words, the assumption of fixed structural parameters has been valid.

All series under examination in this chapter have stable seasonal factors over time at the 1 percent level of significance. All F values exceed either the X-11 supplied value of 2.41, or the more appropriate level for these series of 2.48.

TABLE 8

STABLE SEASONALITY TEST, ALBERTA SECTORS, 1961-1968

	F Value
Total Non-agricultural Alberta Labor Force	117.24*
Manufacturing	9.06*
Transportation, Communication	115.05*
Trade	63.92*
Community, Business, Personal Services	9.16*

*Stable Seasonality Present at the 1 Percent Level (2.48).

Summary: The Seasonal Factors

A summary of the behavior of the seasonal factors for the various Alberta sectors should be made at this point. Firstly, although a purely visual inspection of the seasonal factors would indicate slight changes in that some trough amplitudes are becoming more shallow over time, the computed F values leave little doubt that the factors are stable and that this movement is insignificant.

Secondly, the average value of the seasonal factor for the Community, Business and Personal Services is tightly distributed about its mean. Of the industrial sectors analyzed in this chapter, these services possess the smallest standard deviation with a value of 1.0. The direct implication to follow from this is that these services are the least susceptible to seasonal variation and have relatively greater stability of employment compared to the other sectors. The same can be said for the Trade sector with a standard deviation of 1.9 for its seasonal factor.

Thirdly, the seasonal patterns traced out by the seasonal factors generally contain only single values for maximum and minimum amplitudes. Trade employment achieves lows in the early part of the year but then rises steadily to attain a secondary maximum in June. With the coming of the summer holidays employment then begins a slight decline until the month of September. From this point on, employment climbs steadily until the Christmas season as is indicated by the seasonal factor. The Community, Business and Personal Services show a similar secondary maximum between the months of January and February.

Testing Oi's Hypothesis

Obtaining data on wage rates by industry to calculate the linear correlation coefficient between wage rates and the size of seasonal swings for each industry proved no easy task. Although wage rates are surveyed on a monthly basis by Statistics Canada and the results released in Publication 72-002, Employment, Earnings and Hours, these data are far from satisfactory for the purposes of this project. For one thing, these data refer only to large firms employing 20 or more workers, thereby leaving out the small firms which are characteristic of the service industries. The average firm in the services generally employs well under ten workers according to the 1966 Census of Merchandising and Services. Secondly, by far the vast majority of the service industry is not surveyed in Publication 72-002. Most of the data released highlight only the secondary sector of the economy.

Because of these problems it will become necessary to use income data for 1970 from the 1971 Census of Population. Income data from all size firms and for all industries in the economy are obtainable from the Census. Unfortunately no industry average hourly wage rates are available, only annual income levels by sex and occupation, occupations by industry and hours worked by industry. Through the appropriate weighting of these factors, it was possible to derive an implicit average hourly wage for each industry examined.

A linear correlation coefficient was then calculated to measure the relationship between the industry average hourly wage rate and the amplitude of the seasonal factor for the year for which the last seasonal factors were available, namely 1969. As Table 9 indicates, the calculated linear correlation coefficient was -.94, at the 95 percent confidence level. These results would indicate that a strong inverse correlation exists between the size of seasonal swings and the average hourly wage rate by industry. In other words, a narrowly dispersed seasonal factor is associated with a high average hourly wage rate, and vice-versa.

The Cyclical Factors

While it is evident from Table 4 that the service industries appear to have grown the most rapidly of all industries over the past years, it is interesting to look at the growth rates of their cyclical factors as displayed by the X-11. The cyclical factors for the various Alberta sectors are contained in Figures 9 to 13.

TABLE 9

LINEAR CORRELATION COEFFICIENT: SEASONAL VARIABILITY OF EMPLOYMENT AND INDUSTRY HOURLY WAGES, ALBERTA INDUSTRIES

Industry	Percentage Seasonal Variation, 1969	Average Industry Hourly Wage, 1970
Manufacturing	5.3	$3.46
Transportation, Communication and Utilities	9.6	3.29
Trade	5.1	3.38
Community, Business, Personal Services	4.1	3.47

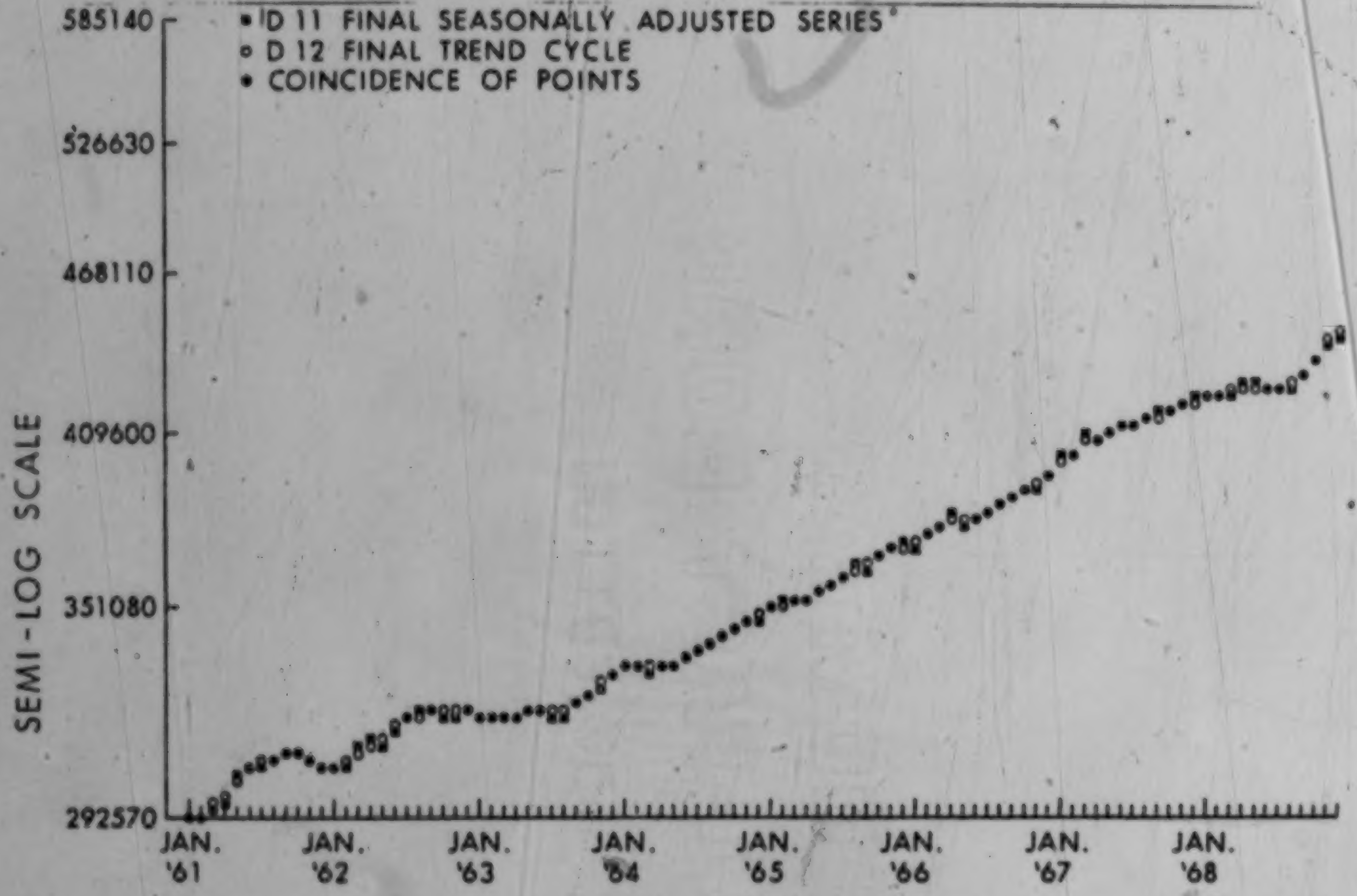
Linear Correlation Coefficient:	- .94
Calculated T-Value:	-3.83
T-Value at .95 Level:	-2.92
Conclusion:	Reject Ho:p = 0 at .05 level

All data on these charts are presented in the units of the original series plotted on a semi-log scale. The small black squares indicate the final seasonally adjusted series as contained on Table D11 of the X-11 printout. These values are obtained by dividing the final seasonal factors into the original series. The small white circles indicate the values of the final cyclical factor from Table D12 of the X-11 printout. Its values are derived by using one of the three Henderson moving averages on the final seasonally adjusted series modified for extremes.

Over the time span 1961 to 1968, it is observed the non-agricultural Alberta labor force increased by 53 percent. High growth rates could therefore be expected in the various sectors examined. As can be seen from Table 10, the highest growth rates were observed in the Trade sector and in Community, Business and Personal Services.

FIGURE 9

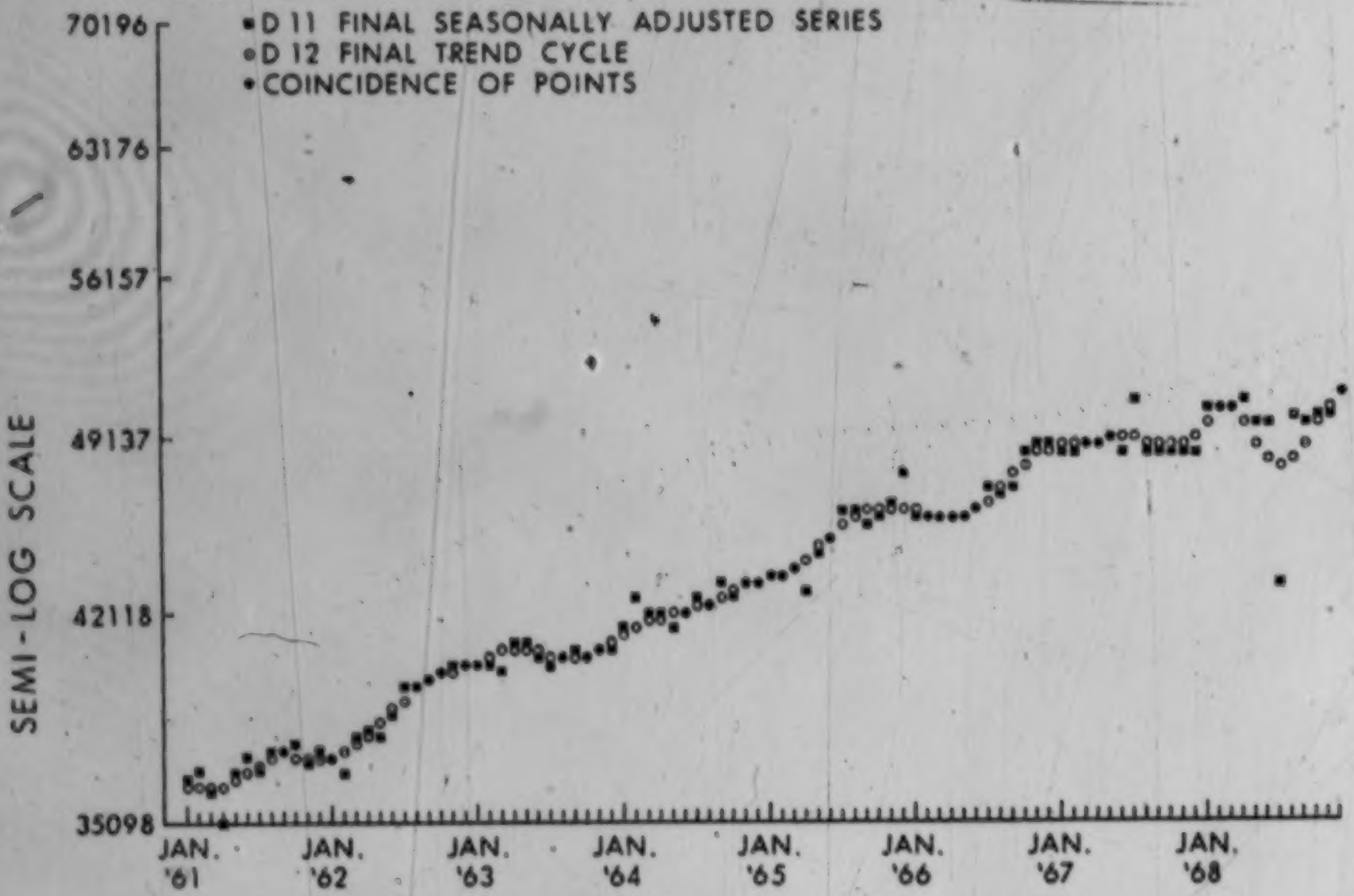
Cyclical Factor, Non-agricultural Labor Force, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

FIGURE 10

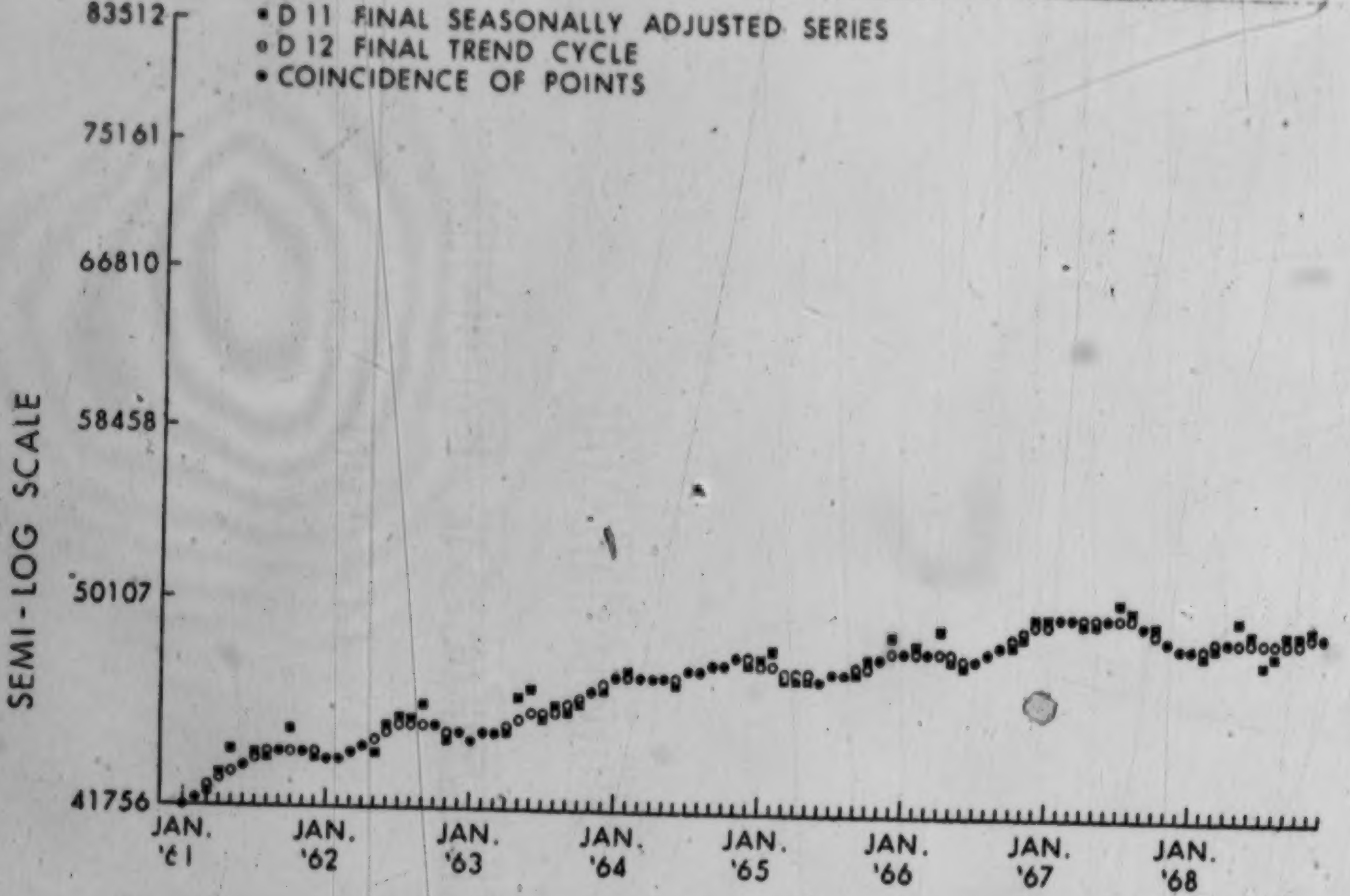
Cyclical Factor, Manufacturing, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969

FIGURE 11

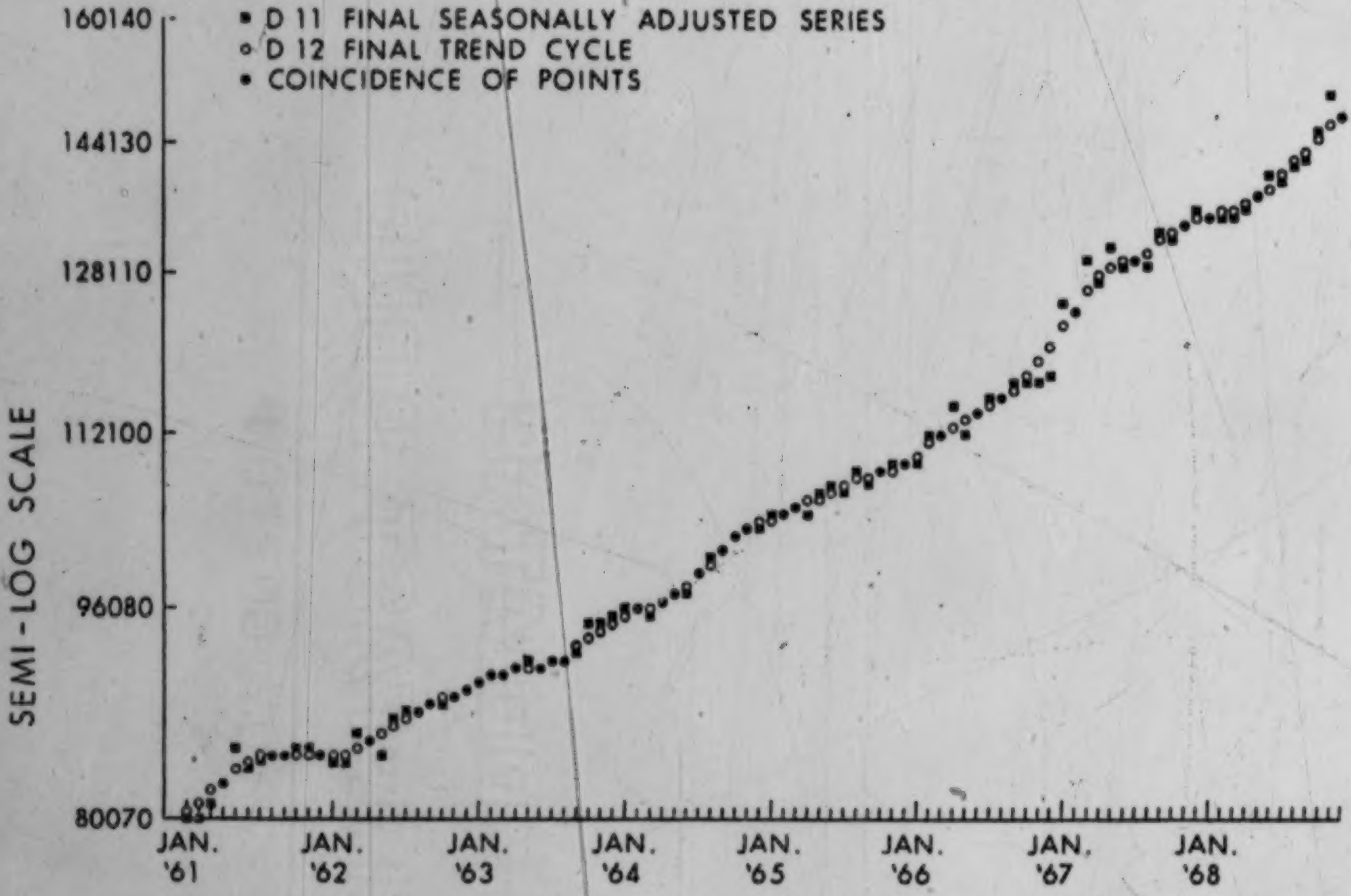
Cyclical Factor Transportation, Communications and Utilities, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

FIGURE 12

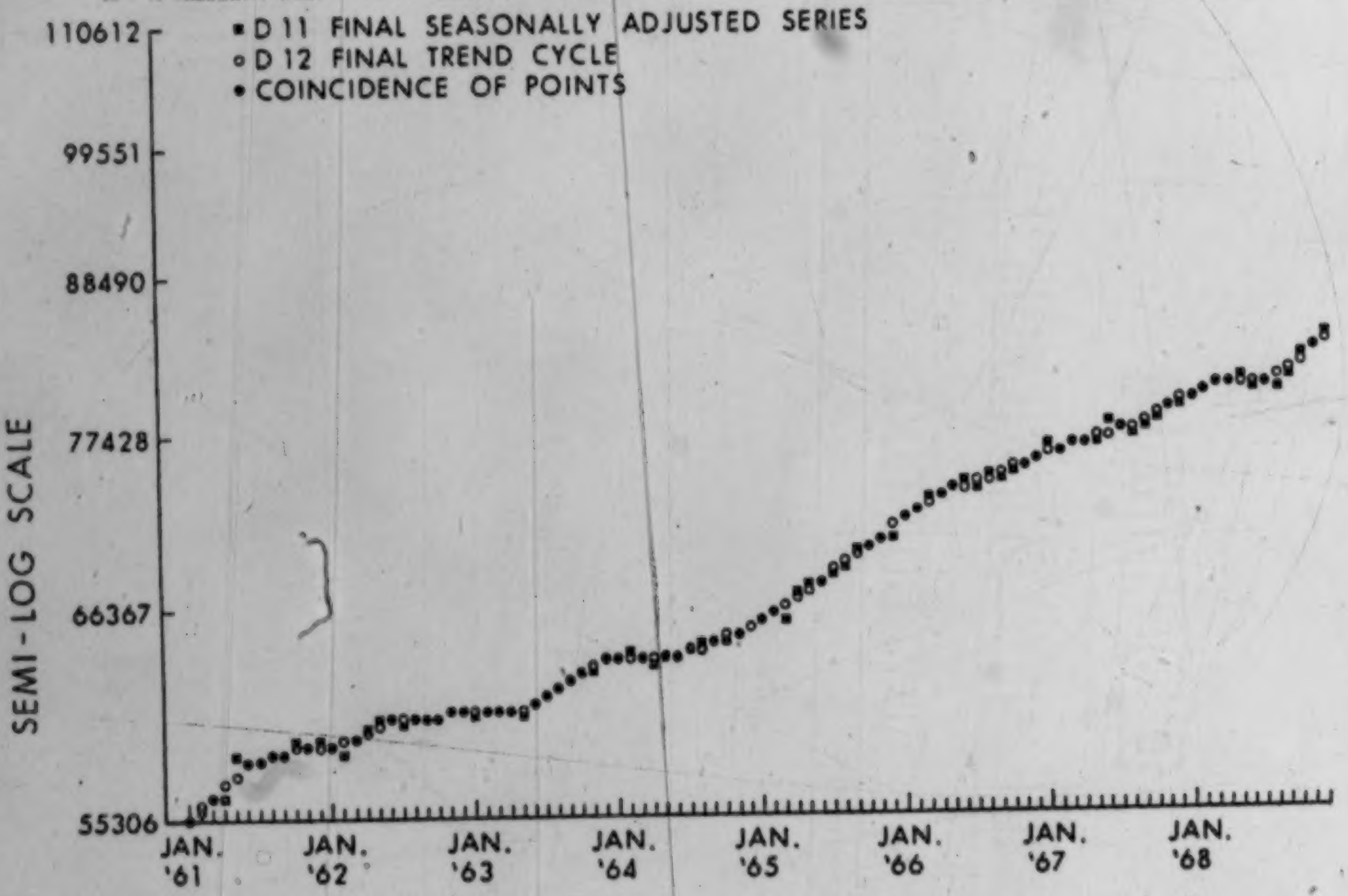
Cyclical Factor, Community, Business and Personal Services, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

FIGURE 13

Cyclical Factor, Trade, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Cat. No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

TABLE 10

GROWTH OF THE HENDERSON-DERIVED CYCLICAL FACTOR, ALBERTA SECTORS, 1961-1968

	Percent Growth Rate, 1961-1968 Cyclical Factor
Total Non-agricultural Alberta Labor Force	53.0
Manufacturing	40.6
Transportation, Communication	17.9
Trade	50.3
Community, Business, Personal Services	83.2

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

CHAPTER IV

INTRA-INDUSTRY COMPARISON: THE SEASONAL VARIABILITY OF ALBERTA'S COMMUNITY, BUSINESS AND PERSONAL SERVICES

In terms of seasonal variability, the Community, Business and Personal Services in Alberta have stable seasonal factors with both the smallest range and smallest standard deviation of all of the provincial seasonal factors examined. The cyclical growth of these service industries was also the most rapid of all sectors examined. Thus it would appear that the Community, Business and Personal Services of Alberta could profitably be examined for their individual services to see how they fare in comparison to their previously examined aggregate.

Data: Sources and Methods

Direct comparability of data will be an unavoidable problem in the individual Alberta services analysis. It is unfortunate that Statistics Canada occasional Publication 72-508 is not able to be used in this chapter, but this publication does not disaggregate the Community, Business and Personal Services industry. Therefore, instead of being able to obtain an estimate of both small and large firms which the latter publication contains, Statistics Canada Publication 72-002 must be used, which is solely a survey of large firms employing 20 or more persons. Given the fact that a great many service establishments employ but a small number of persons, the resultant seasonal factors will have to be carefully examined.

The Alberta Services to be Examined

In order to obtain some idea of the relative size of the service categories in the service industry, Table 11 showing the various subgroups of Alberta has been included. To avoid the comparison of raw data and index numbers, this table shows only the total number of employees in each category as compiled from the 1971 Census.

TABLE 11

THE SERVICE INDUSTRIES, ALBERTA, 1971

	Total Employees '000	Share of Labor Force percent
Service	352.1	51.2
Trade	104.2	15.1
Finance, Insurance and Real Estate	25.3	3.8
Community, Business and Personal Services	168.5	24.5
Education, Health, Religious	94.5	13.7
Business Services	39.4	5.7
Hotels, Restaurants, Taverns	27.0	3.9
Recreation Services	6.1	.9
Miscellaneous Services	11.5	1.7
Public Administration and Defence	54.1	7.9

Source: Census User Summary Tapes, Statistics Canada, Ottawa.

The first subgroup of Community, Business and Personal Services examined is the Business Services group. This group encompasses Standard Industrial Classification numbers 861-869. Included in this grouping are such establishments as accounting firms, advertising agencies, engineering and scientific services, as well as various other services offered to business management. This group also includes the various law practitioners including lawyers, barristers, solicitors, advocates and patent attorneys.

The second subgroup examined is the Personal Services group of Alberta. This group is subdivided into another category in Statistics Canada Publication 72-002, namely that of Hotels, Restaurants and Taverns. However, it should be noted that because of the previously described difficulty of index numbers versus raw employment data, it is impossible to separate the latter subgroup from the Personal Services for the time span of the project.

The Personal Services group comprises Standard Industrial Classification numbers 871-879, 875 being the Hotels, Restaurants and Taverns subgroup. With the exception of Standard Industrial Classification number 875, Personal Services is comprised of shoe repair shops, barber and beauty shops and servants to private households, which includes cooks, maids, butlers and gardeners. Laundries and cleaners are also classified as a Personal Service, and these in turn include such diverse services as carpet cleaners, towel services, diaper services, fur cleaners and fur storage services. Funeral directors, lodging houses, private clubs, tailors, hunting and fishing guides and tourist guides are also considered Personal Services.

The major subgroup of Personal Services in Alberta, namely Hotels, Restaurants and Taverns, are considered to be those establishments providing meals and/or lodgings on a seasonal or year-round basis. This includes all cafes, restaurants, hotels, motels, tourist camps, cabin camps and services such as catering and banquet firms.

The Seasonal Factors of the Alberta Services

The seasonal factors for the three subgroups of the Community, Business and Personal Services do not behave in a fashion similar to that for the group as a whole. Glancing at their graphic displays in Figures 14 to 16, two differences are immediately obvious: firstly, the magnitude between the crests and troughs of the individual services is much greater than that of the rather small seasonal amplitudes of the group as a whole. And secondly, the individual services appear to be showing a slight decrease in their seasonal factor amplitudes over time.

The distribution of the average values of the seasonal factor for the individual services varies greatly from the Community, Business and Personal Services as a group. As a total group the services have an average standard deviation of 1.0. However, the average value of the seasonal factors of the subgroup are more widely dispersed. In fact their lowest standard deviation is greater than the highest standard deviation found for the two goods sectors of the Alberta economy examined in the previous chapter.

Business Services have a standard deviation of 4.6. But Personal Services and its attendant subcategory of Hotels, Restaurants and Taverns, have deviations of 9.4 and 10.8, respectively – a very wide dispersion.

The range of the seasonal factors is also much greater in the individual services. This varies from a range quadruple that of the whole services group for the Business Services, to seven times this magnitude for the Personal Services, an indication of relatively greater seasonal variability.

TABLE 12

STANDARD DEVIATION OF AVERAGE SEASONAL FACTORS FROM THE MEAN, ALBERTA SERVICES, 1961-1968

	Standard Deviation	Mean
Community, Business and Personal Services	1.0	100.0
Business Services	4.6	100.0
Personal Services	9.4	100.0
Hotels, Restaurants and Taverns	10.8	100.0

Source: Calculated from Statistics Canada, *Estimates of Employees by Province and Industry*, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and *Employment Earnings and Hours*, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

TABLE 13

RANGE OF SEASONAL FACTORS, ALBERTA SERVICES, 1961-1969

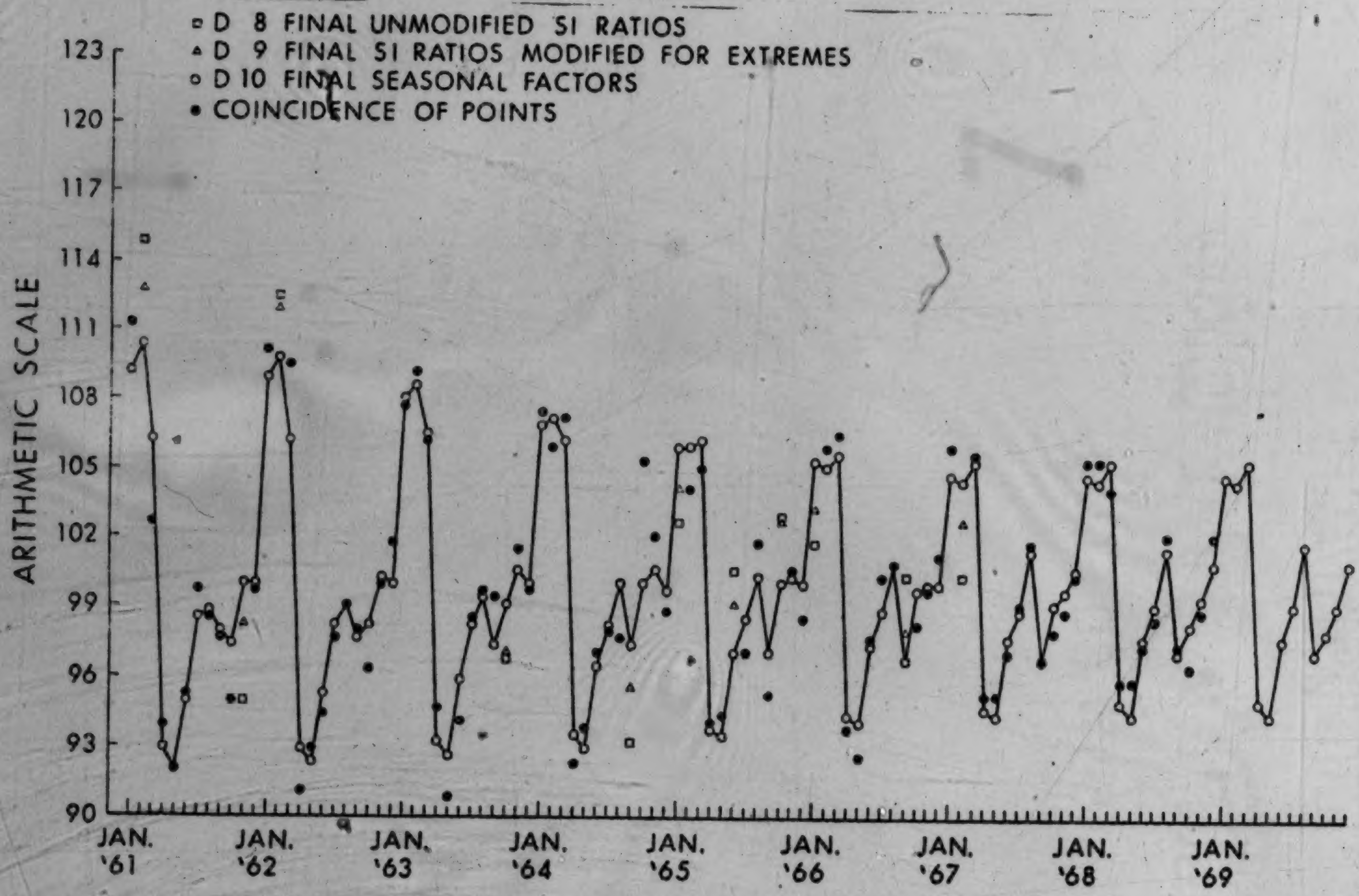
	1961	1969*
Community, Business and Personal Services	98.7-101.2	98.3-102.4
Business Services	92.1-110.7	94.6-105.5
Personal Services		
Hotels, Restaurants and Taverns	88.2-122.3	90.4-114.2

*Projected.

Source: Calculated from Statistics Canada, *Estimates of Employees by Province and Industry*, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and *Employment Earnings and Hours*, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

FIGURE 14

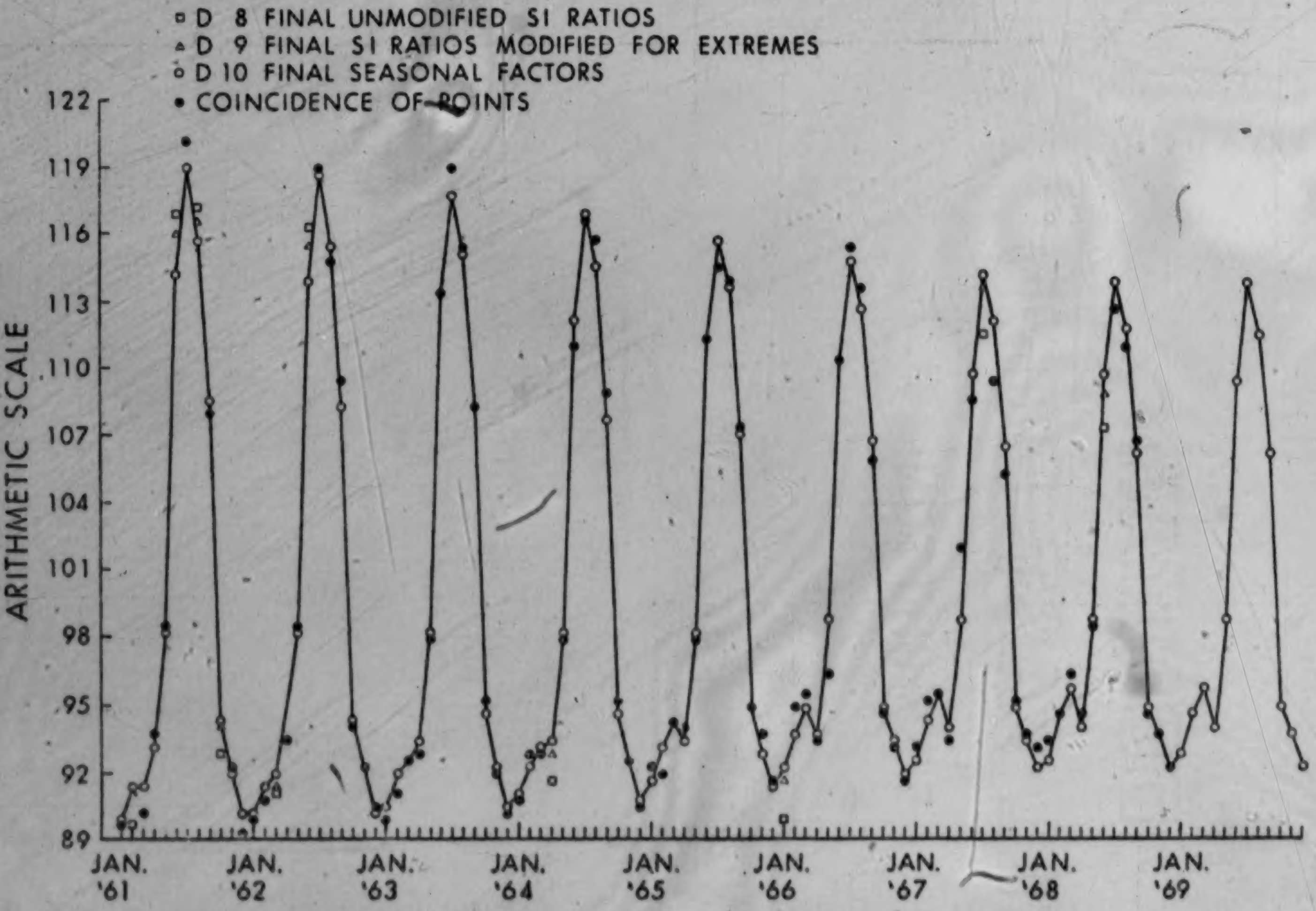
Seasonal Factors, Business Services, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 15

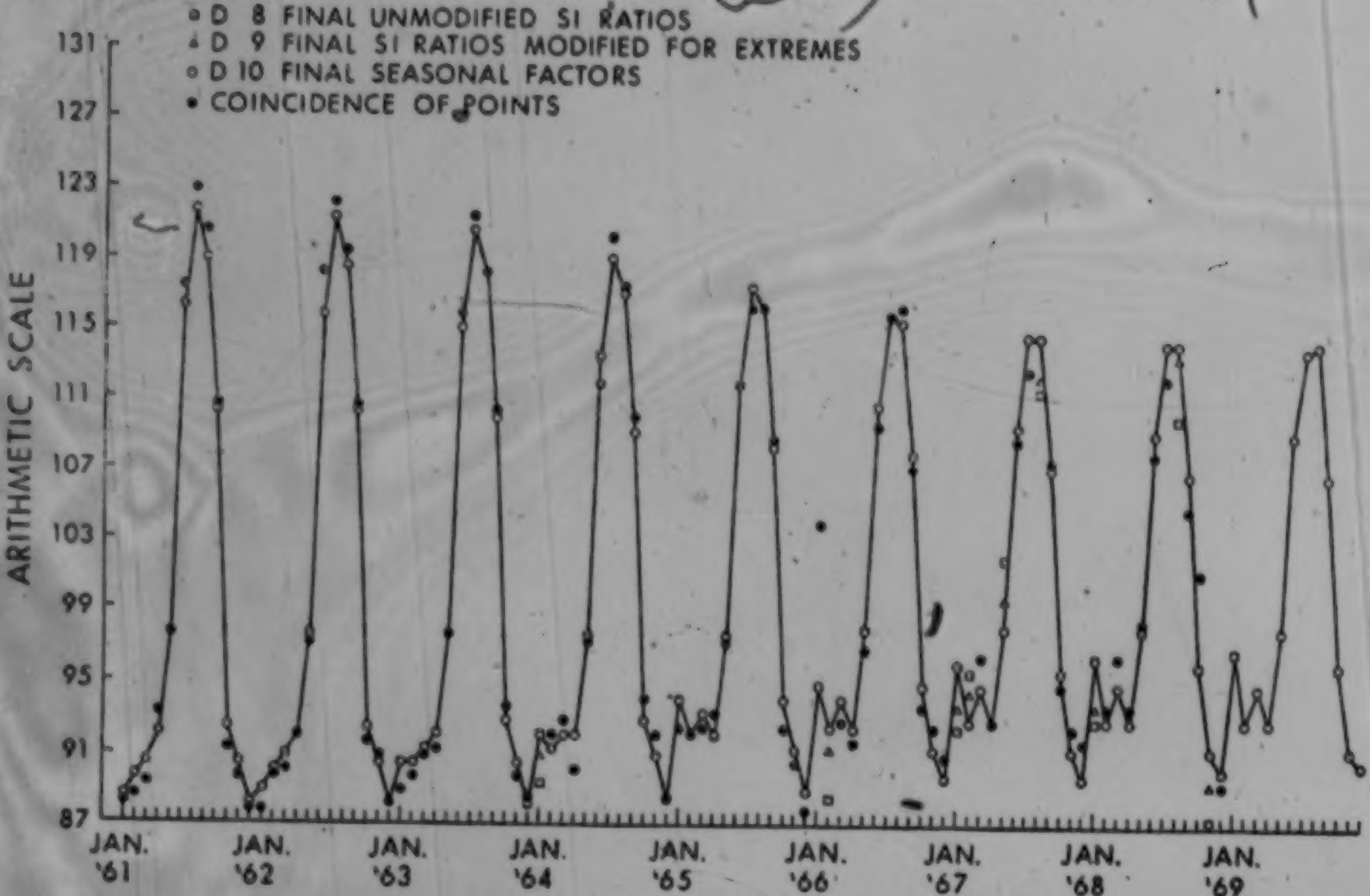
Seasonal Factors, Personal Services, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 16

Seasonal Factors, Hotels, Restaurants and Taverns, Alberta, 1961-1969



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

TABLE 14

MONTH OF EXTREME AMPLITUDE OF SEASONAL FACTORS, ALBERTA SERVICES, 1961-1968

	Crest	Trough
Community, Business and Personal Services	June	August, October
Business Services	February, March	May
Personal Services	July	November, December
Hotels, Restaurants and Taverns	July	December

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and Employment Earnings and Hours, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

While the Community, Business and Personal Services reach their largest seasonal amplitude in June, Business Services do not do so until February or March. The Business Services are somewhat unique as to when their seasonal factor reaches its maximum amplitude. Maximum and minimum values follow closely together in late winter or early spring, unlike the seasonal factors of the other subcategories.

Personal Services and Hotels, Restaurants and Taverns follow a more conventional pattern, factor peaks experienced during the summer months and troughs during mid-winter.

The F-test was applied to the seasonal factors of the subgroups of the Community, Business and Personal Services. As Table 15 indicates, the Alberta seasonal factors were found to be stable over time, all computed F values exceeding 2.48, the 1 percent level of significance.

TABLE 15

STABLE SEASONALITY TEST, ALBERTA SERVICES,
1961-1968

	F Value
Community, Business and Personal Services	9.16*
Business Services	27.48*
Personal Services	185.26*
Hotels, Restaurants and Taverns	102.16*

*Stable Seasonality Present at the 1 Percent Level (2.48).

Summary: The Seasonal Factors

A number of points can be made as to the behavior of the seasonal factors of the Alberta service industries. Firstly, it has been found that the seasonal factors are stable over time using the ANOVA test. Therefore, the swings in amplitude of the seasonal factor which appear to becoming slightly smaller over time is a movement still statistically insignificant.

A second difference lies in the timing of the maximum amplitudes of the seasonal factors, that is, in their seasonal patterns. Most of the services subcategories exhibit patterns of summer crests and winter troughs. The one exception in the previous chapter was found to be the Trade sector. For the services examined here, the Business Services have a maximum value of the seasonal factor in February or March followed by a low value in May.

Thirdly, the range of the seasonal factors for the Alberta services is far greater than that exhibited in the previous chapter for the various Alberta sectors. This would appear to indicate that the seasonal factor has a greater influence on services employment than on the other sectors. This is confirmed by the standard deviation of the average seasonal factor for the Alberta services subcategories. Excluding the value for the Community, Business and Personal Services as a whole, the lowest standard deviation found, a value of 4.6 for Business Services, is larger than the maximum value of 4.1 found in the previous chapter for Transportation, Communication and Utilities.

The Anomoly Presented by the Seasonal Factors

Considering the behavior of the seasonal factors over time for the individual services, it would appear that the behavior of the whole is at odds with that of some of its components. The seasonal factors appear to be subject to larger amplitudes for the individual services than for the group as a whole.

It is difficult to pinpoint the reason behind this apparent contradiction. Nevertheless, it is probably due to the nature of the data used. The Community, Business and Personal Services were obtained from Statistics Canada Publication 72-508, which is a comprehensive survey of all establishments, large and small. The individual services were obtained from Statistics Canada Publication 72-002 by way of Hobson's choice. This publication is strictly a large firm survey covering only those establishments employing 20 or more people. Thus it is important to remember that the small firms are omitted from this Statistics Canada publication.

Economic research indicates that most service firms tend to be smaller establishments, usually owner-managed, with but few employees.[33] It would appear that a significant number of these establishments in the individual services may have been omitted and this omission is having its effect on the displayed seasonal factors. This does, nevertheless, enable a distinction to be made between the behavior of large firms and all size firms of the services in general.

Smaller establishments, or firms employing fewer than 20 persons, may be less subject to seasonal variation because a larger percentage of their labor resources is self-employed manpower. In other words, for given seasonal fluctuations in demand, the small firm may respond by scheduling more hours for its existing work force, rather than to hire additional workers. Overtime is substituted for hiring, indicating that for the profit maximizing small firm, $\frac{F}{H} + \frac{T}{H} > (a + b - c)W$. Such action on the part of the small firm would result in less seasonal variation in its employment time series.

The larger firms, however, may show greater seasonal variability in employment because $\frac{F}{H} + \frac{T}{H} < (a + b - c)W$. In a small, owner-managed firm, whenever overtime hours are scheduled it does not necessarily follow that overtime wages are paid. Much of the overtime may be handled by the owner himself, or by members of his immediate family. A 60 hour week may not be uncommon.[34] However, in a large firm with non-family employees, overtime wages must be paid and legislated maxium daily work hours scrupulously observed. This could result in the condition that $\frac{F}{H} + \frac{T}{H} < (a + b - c)W$, so that more employees are hired to meet seasonal increases in demand, with the resultant increases in the seasonal variability of employment for larger firms. The possibility also exists, of course, that some small firms simply choose not to meet seasonal increases in demand.

---

[33] V.R. Fuchs, The Service Economy, National Bureau of Economic Research, New York, 1968, pp. 190-191.

[34] Statistics Canada does not release data on the length of the work week for firms of fewer than 20 employees, nor does it release overtime hours for any size firm.

Testing Oi's Hypothesis

Looking at Table 16, it is once again evident that a negative linear correlation exists between the size of seasonal employment swings and the industry average hourly wage rate. The Personal Services in Alberta are characterized by both a high seasonal variability in employment as well as the lowest wage rate examined here. Business Services, on the other hand, have a relatively small seasonal variability in employment and the highest hourly wage rate. However for the industries examined here, the linear correlation coefficient is somewhat weaker than that found in the previous chapter, with a value of -.69 at the 80 percent level of confidence. Nevertheless, it is not unreasonable to conclude that a weak inverse correlation exists between the two variables.

The Cyclical Factors

The growth of the cyclical factors of the various Alberta services as calculated by the X-11 are shown in semi-log form in Figures 17 to 19.

TABLE 16

LINEAR CORRELATION COEFFICIENT: SEASONAL VARIABILITY OF EMPLOYMENT AND INDUSTRY HOURLY WAGES, ALBERTA SERVICES

Industry	Percentage Seasonal Variation, 1969	Average Industry Hourly Wage, 1970
Community, Business, Personal Services	4.1	$3.47
Business Services	10.9	4.51
Personal Services	22.0	2.29
Hotels, Restaurants	23.8	2.77

Linear Correlation Coefficient: - .69

Calculated T-Value: -1.35

T-Value at .80 Level: -1.061

Conclusion: Reject Ho:p = 0 at the .20 level.

TABLE 17

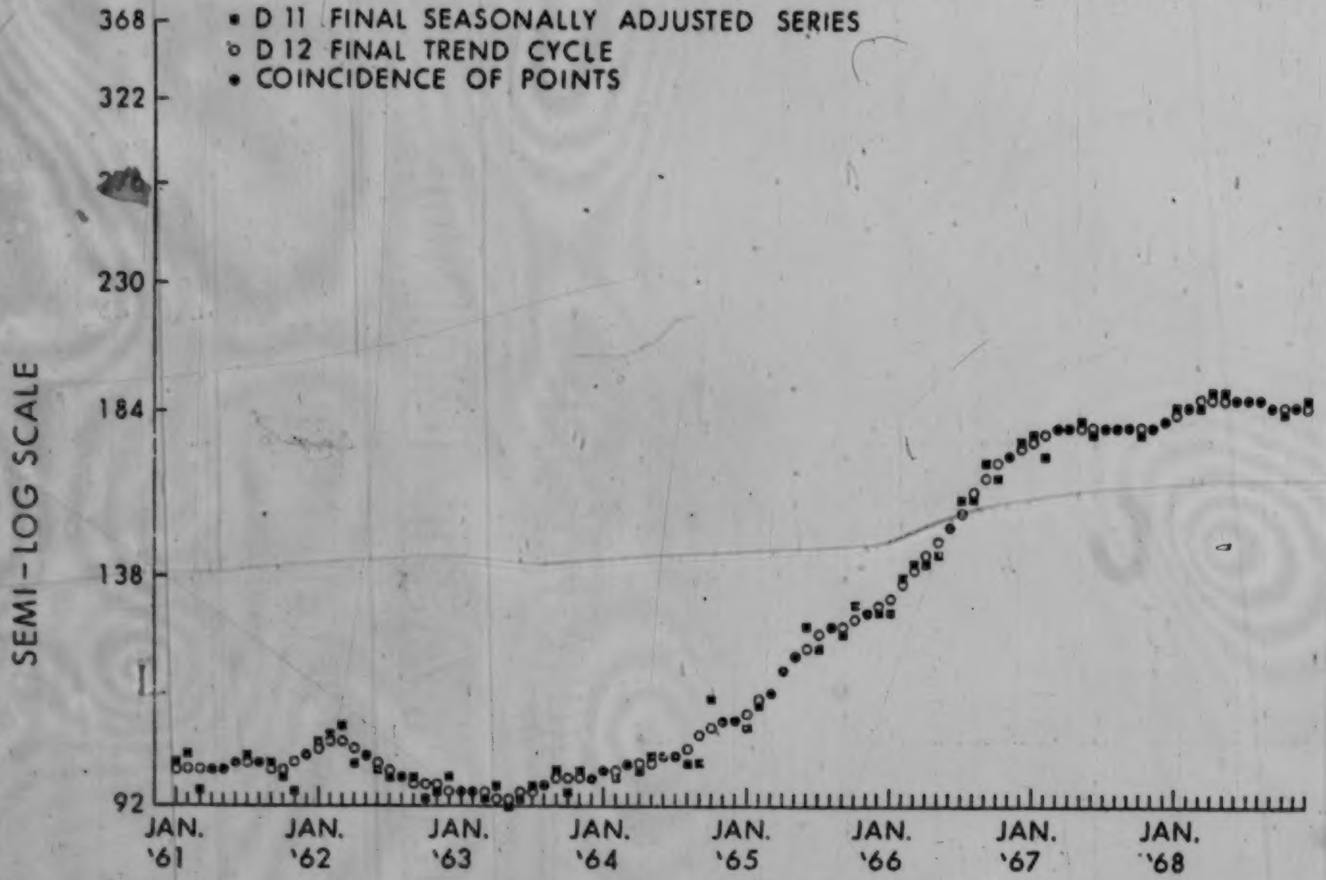
GROWTH OF THE HENDERSON-DERIVED CYCLICAL FACTOR, ALBERTA SERVICES, 1961-1968

	Percent Growth Rate, 1961-1968 Cyclical Factor
Community, Business and Personal Services	83.2
Business Services	91.3
Personal Services	74.1
Hotels, Restaurants and Taverns	108.8

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and Employment Earnings and Hours, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

FIGURE 17

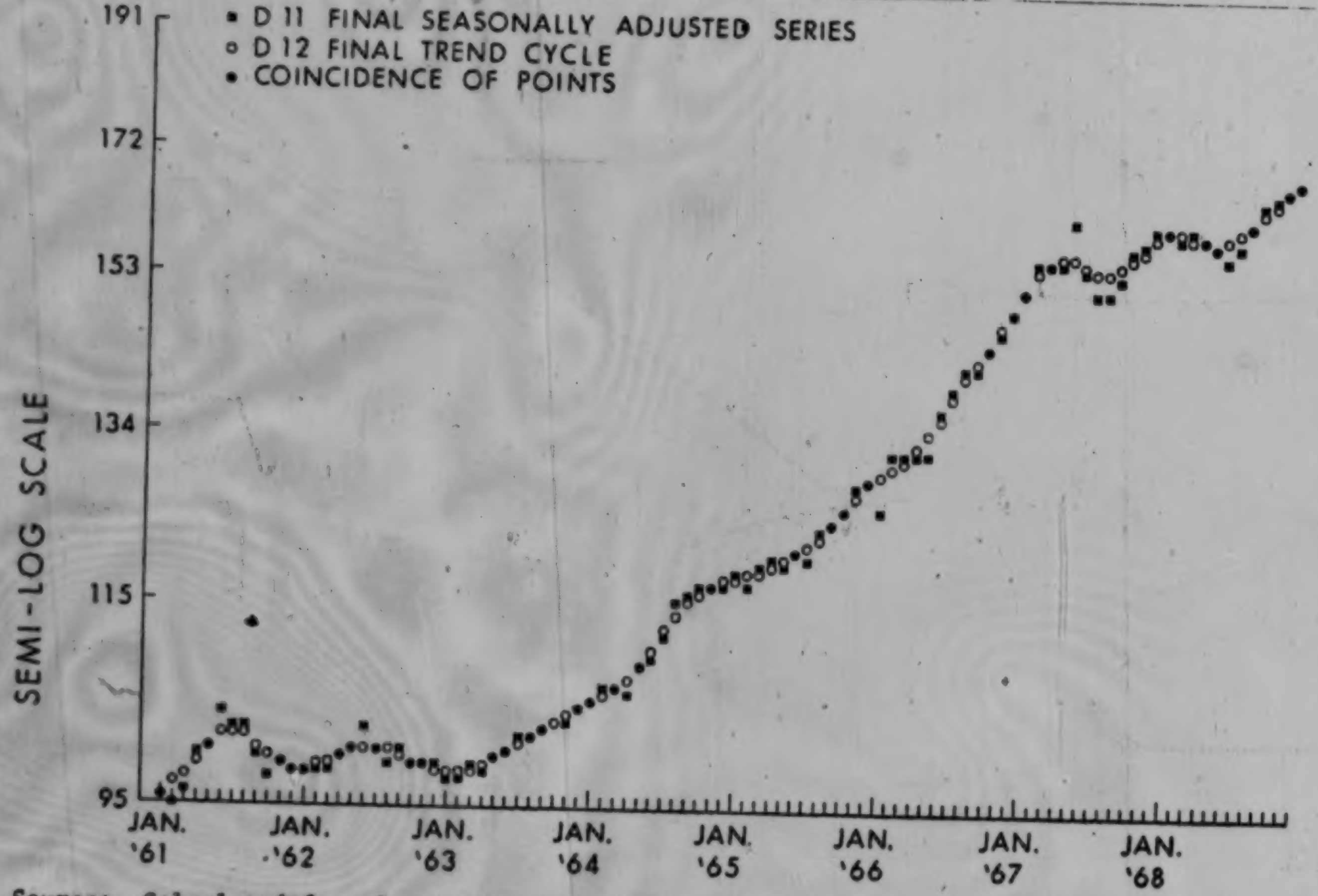
Cyclical Factor, Business Services, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 18

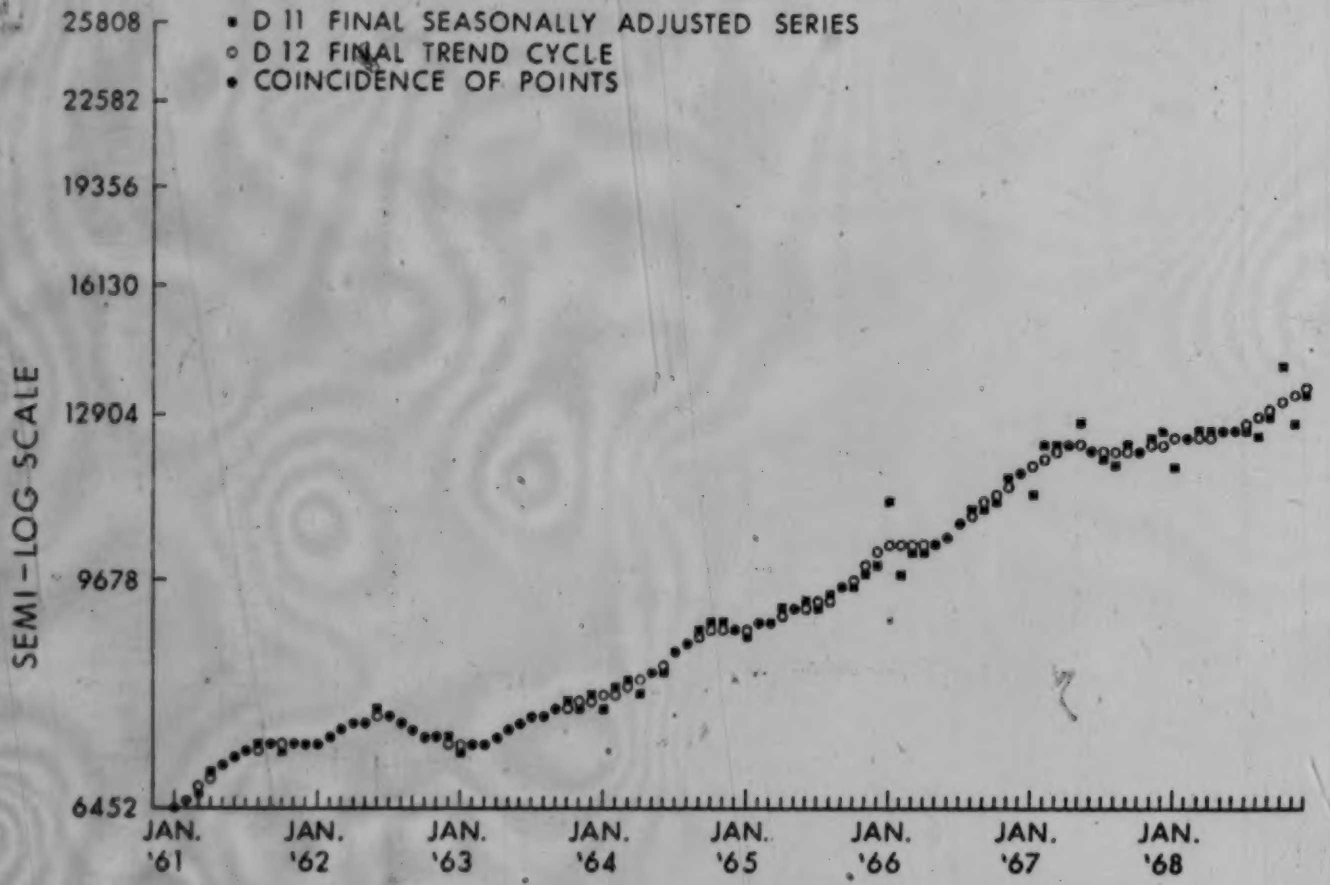
Cyclical Factor, Personal Services, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 19

Cyclical Factor, Hotels, Restaurants and Taverns, Alberta, 1961-1968



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

Of the individual Alberta services examined in this chapter, the Hotels, Restaurants and Taverns subgroup had the highest growth rate with a figure of 108.8 percent. This was followed closely by the Business Services with a rate of 91.3 percent. It becomes evident that the growth rates of the individual services are more than twice the growth rates of the goods sectors analyzed in the previous chapter.

CHAPTER V

INTRA-INDUSTRY COMPARISON: THE SEASONAL VARIABILITY OF CANADA'S COMMUNITY, BUSINESS AND PERSONAL SERVICES

The previous chapter examined the individual subcategories of the services in Alberta as closely as permitted by the data available. In this chapter, the same services subcategories for Canada as a whole will be examined so that it will be possible to draw comparisons between the seasonal behavior of Alberta's individual services to those for Canada.

Data: Sources and Methods

Again in this analysis there is the unavoidable dichotomy in sources of data. The group Community, Business and Personal Services for Canada will be drawn from Statistics Canada Publication 72-508 and will be presented as raw employment figures. This service category comprises Standard Industrial Classification 801-899.

Personal Services must be drawn from Statistics Canada Publication 72-002 for the reasons outlined in the previous chapter. It is a case of either using this data or nothing at all. Therefore, this employment data must be presented as index numbers. The largest subgroup of the Personal Services is the Hotels, Restaurants and Taverns group. Employment figures for this group were also obtained from Statistics Canada Publication 72-002. However, it must be kept in mind that this catalogue is a large firm survey, compiling only those establishments with 20 or more employees. This cutoff point undoubtedly leaves out the majority of Canadian services establishments. Yet the choice is to make do with the only data available or to ignore these sectors altogether. The data presented for this subcategory, Standard Industrial Classification 875 are in the form of raw employment figures.

Business Services for Canada are also examined. The data for 1961 through 1968 are obtained from Statistics Canada Publication 72-002 and are also presented as index numbers. Business Services comprise all the categories included in Standard Industrial Classification numbers 861-869.

In order to have a more meaningful comparison of the relative size of these various services subcategories in Canada without having to resort to a mix of raw employment data and index numbers, Table 18 has been included. The information in this table was obtained from the 1971 Census and shows detail that is not possible to obtain from regular Statistics Canada publications.

The Seasonal Factors of Canada's Services

The Canadian services examined here present a more tightly grouped series of final seasonal factors than the Alberta services, as is evidenced by the graphic displays in Figures 20 to 23. The Canadian Community, Business and Personal Services have average seasonal factors with the lowest standard deviation yet encountered in this project with a value of .9. The only previously examined series to have a seasonal factor so tightly grouped is the Community, Business and Personal Services of Alberta with a standard deviation of 1.0.

TABLE 18

THE SERVICE INDUSTRIES, CANADA, 1971

	Total Employees '000	Share of Labor Force percent
Service	4,308.3	49.9
Trade	1,269.3	14.7
Finance, Insurance and Real Estate	358.1	4.2
Community, Business and Personal Services	2,041.1	23.7
Education, Health, Religious	1,129.8	13.1
Business Services	208.8	2.4
Personal Services	510.0	5.9
Hotels, Restaurants, Taverns	331.5	3.8
Recreation Services	75.1	.9
Miscellaneous Services	117.8	1.4
Public Administration and Defence	639.6	7.4

Source: Census User Summary Tapes, Statistics Canada, Ottawa.

TABLE 19

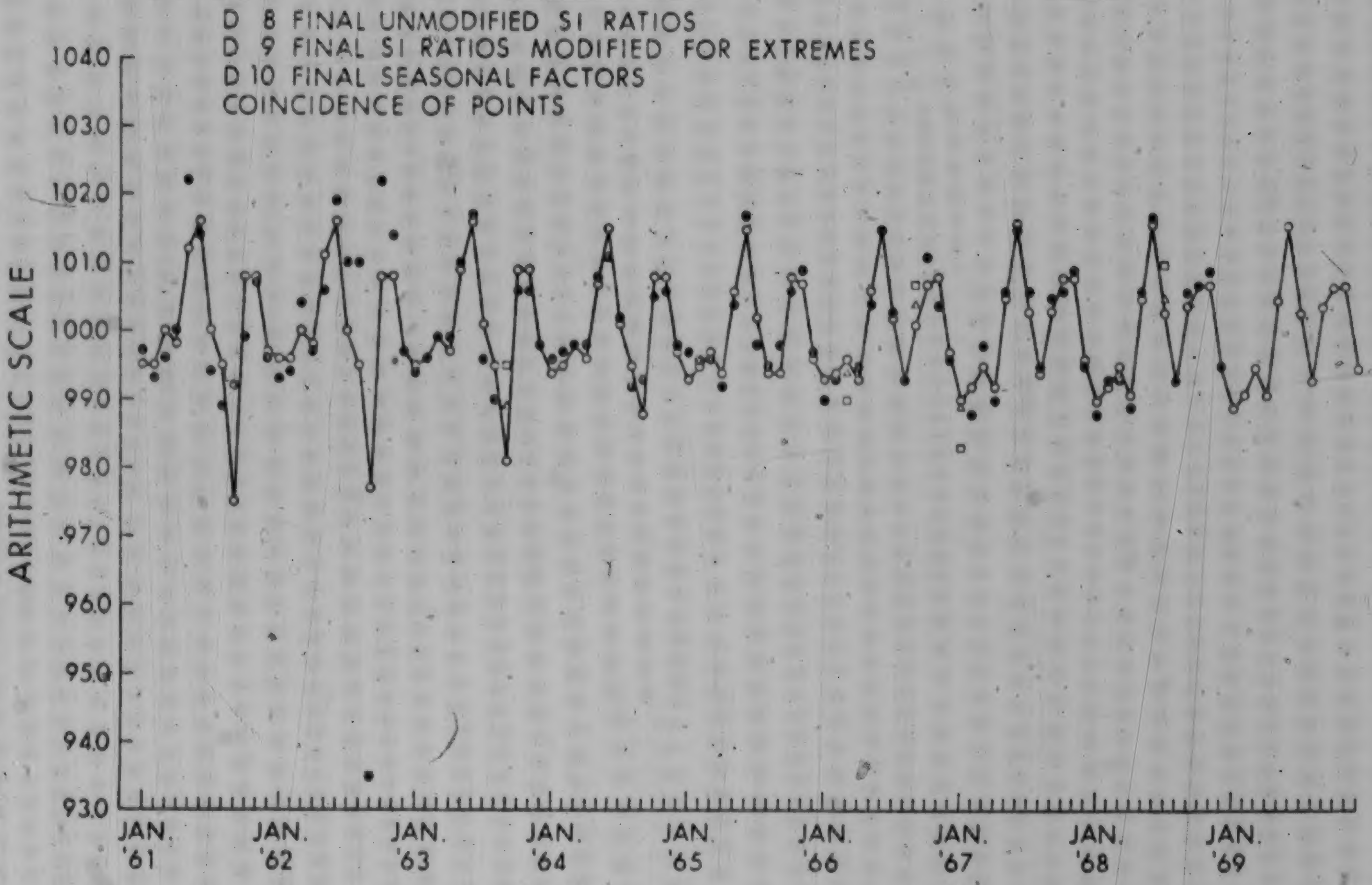
STANDARD DEVIATION OF AVERAGE SEASONAL FACTORS FROM THE MEAN, CANADA SERVICES, 1961-1968

	Standard Deviation	Mean
Community, Business and Personal Services	.9	100.0
Business Services	2.1	100.0
Personal Services	4.0	100.0
Hotels, Restaurants and Taverns	4.5	100.0

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and Employment Earnings and Hours, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

FIGURE 20

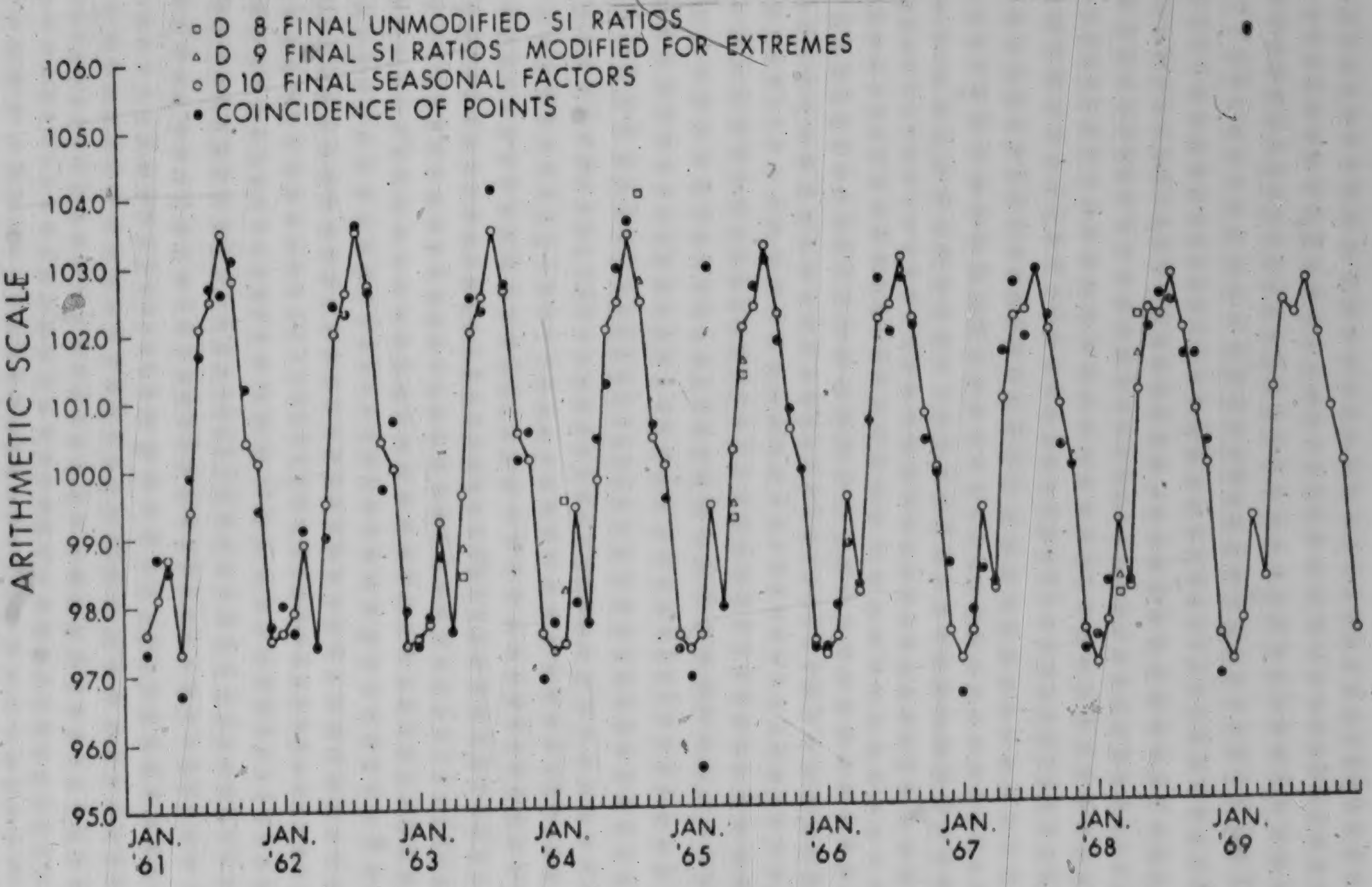
Seasonal Factors, Community, Business and Personal Services, Canada, 1961-1969



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 21

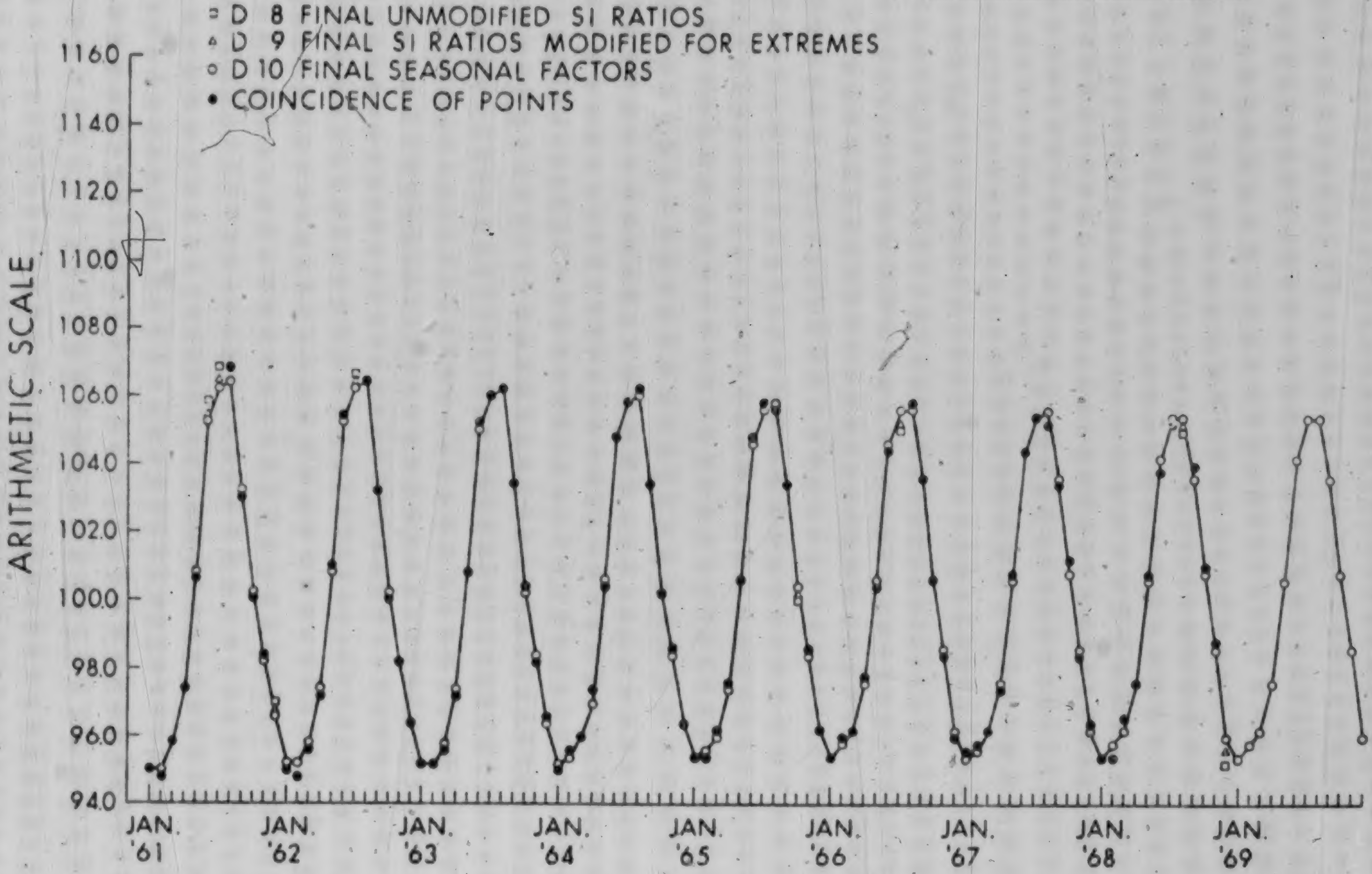
Seasonal Factors, Business Services, Canada, 1961-1969



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 22

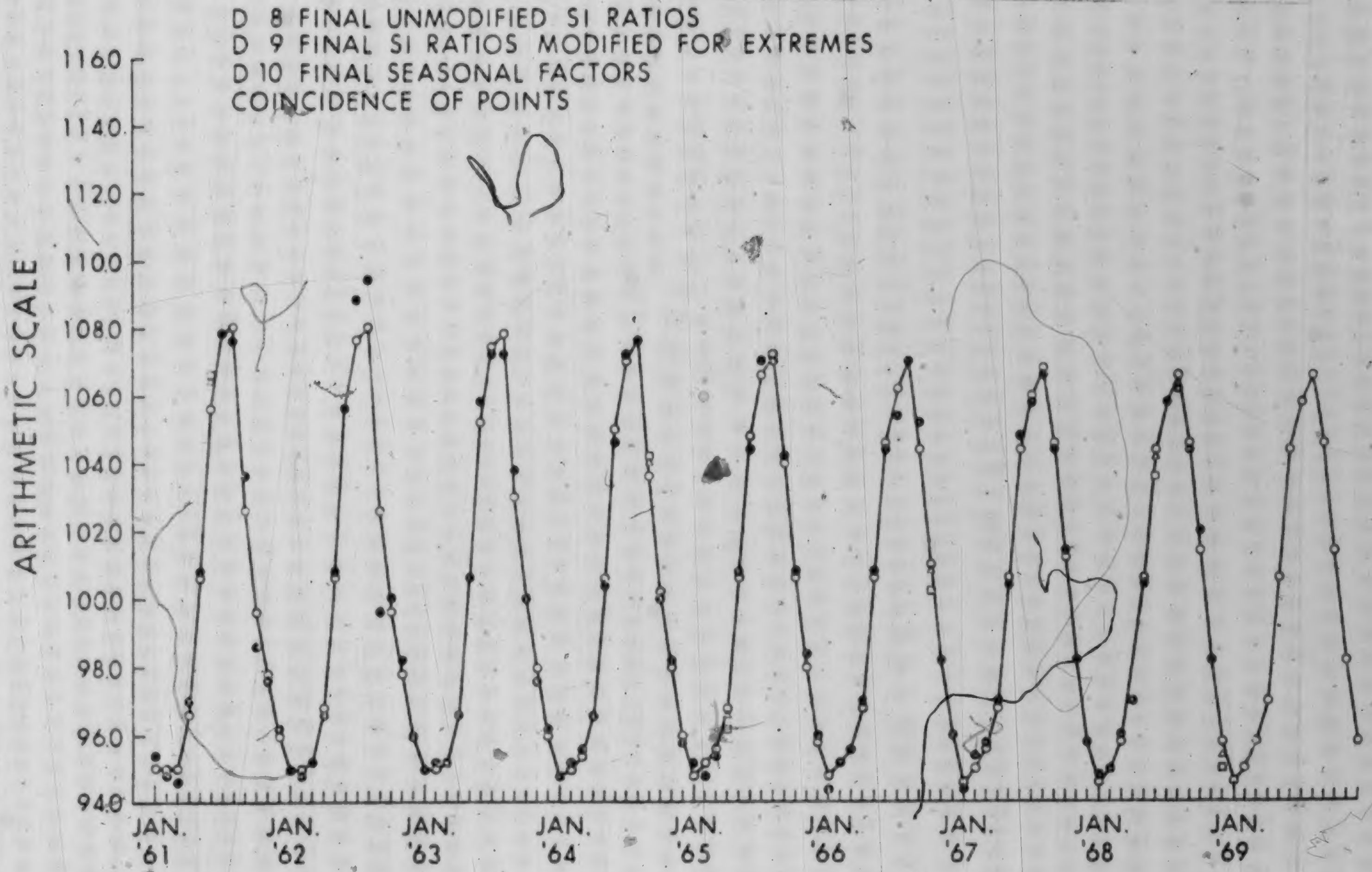
Seasonal Factors, Personal Services, Canada, 1961-1969



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968,

FIGURE 23

Seasonal Factors, Hotels, Restaurants and Taverns, Canada, 1961-1969



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

It is interesting to note that the value of the standard deviation of the Business Services for Canada turns out to be about half that of the comparable service for the Province of Alberta. Business Services for Canada have a standard deviation of 2.1, while those for Alberta have a standard deviation of 4.6.

The same situation is revealed for the Personal Services of Canada. The standard deviation of the average value for the seasonal factor of the Personal Services is 4.0, while that of its largest subcategory, Hotels, Restaurants and Taverns is 4.5. The values for the comparable industries in Alberta are 9.4 and 10.8, respectively.

The seasonal factors for the Community, Business and Personal Services of Canada would appear to be exhibiting decreasing amplitudes over time. The range of the factor is the smallest of any sector examined in this project, projected to be 98.9 to 101.6 in 1969.

The Business Services have seasonal factors showing the second smallest range, with values expected in 1969 of 97.0 to 102.6. The range of the seasonal factor for the Personal Services of Canada was projected to be 95.9 to 105.4 in 1969. The range of its largest subcategory, Hotels, Restaurants and Taverns, was expected to be 94.6 to 106.6. The seasonal amplitudes for these services was found to be twice that of the Business Services for Canada.

The month during which the seasonal factor for the Community, Business and Personal Services achieves its peak value in June. However, the trough, or low value, which has previously occurred in September, has lately tended to occur in January. Business Services follow the conventional pattern. The crest of the seasonal factor falls around July and August. The trough occurs between December and January.

TABLE 20

RANGE OF SEASONAL FACTORS, CANADA SERVICES, 1961-1969

	1961	1969*
Community, Business and Personal Services	97.5-101.6	98.9-101.6
Business Services	97.3-103.5	97.0-102.6
Personal Services	95.0-106.4	95.5-105.4
Hotels, Restaurants and Taverns	94.9-108.0	94.6-106.6

*Projected.

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and Employment Earnings and Hours, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

TABLE 21

MONTH OF EXTREME AMPLITUDE OF SEASONAL FACTORS, CANADA SERVICES, 1961-1968

	Crest	Trough
Community, Business and Personal Services	June	September, January
Business Services	July, August	December, January
Personal Services	July, August	January, February
Hotels, Restaurants and Taverns	August	January

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and Employment Earnings and Hours, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

Personal Services and Hotels, Restaurants and Taverns, both have the trough of their seasonal factors falling in between January and February, while the crests are observed to occur in the summer months of July and August.

As is evident from Table 22, the computed F values for the Canadian services can all be considered to display stable seasonal factors. All seasonal factors are stable at the 1 percent level of significance of 2.48.

TABLE 22

STABLE SEASONALITY TEST, CANADA SERVICES, 1961-1968

	F Value
Community, Business and Personal Services	10.24*
Business Services	56.41*
Personal Services	739.75*
Hotels, Restaurants and Taverns	272.60*

*Stable Seasonality Present at the 1 Percent Level.

Summary: The Seasonal Factor

In summary, a number of points can be mentioned. Firstly, stable seasonal factors over time were found to exist in all of the Canadian services examined. In fact, the computed F values for these services were the largest encountered in this project.

Secondly, the standard deviation of the average value of the seasonal factors of the Community, Business and Personal Services for

Canada was the smallest encountered in this project. Only the Community, Business and Personal Services for Alberta displayed a comparable grouping. The amplitude of the seasonal swings for these services was also the smallest of all the sectors examined. Simply stated this means that employment in the Community, Business and Personal Services of Canada and Alberta is relatively free of large seasonal fluctuations.

Thirdly, the groupings of the average value of seasonal factors about the mean was much closer for Canada's individual services than for Alberta's services. Measured in terms of standard deviation, the groupings were twice as large for Alberta as for Canada. It is possible that this is a large number phenomenon. In accounting only for the larger establishments of Alberta, a seasonal factor may be displayed which is not closely representative of the actual seasonal variability of employment in the Alberta services. However, for Canada as a whole, it is possible that there may be many service establishments employing 20 or more persons, especially in the larger eastern urban centers, resulting in seasonal factors which may present a closer indication of the actual employment variation experienced by these industries. In other words, had the Alberta survey been a comprehensive survey, the standard deviations might be smaller than they now appear to be.

Fourthly, all of the Canadian services examined followed the seasonal pattern of seasonal crests occurring in the summer months while seasonal factor lows occurred in the winter months. The only possible exception to this may be the Community, Business and Personal Services for Canada, which appear to be achieving low seasonal factors in January towards the end of the time span studied.

Testing Oi's Hypothesis

As Table 23 shows, a negative linear correlation exists for the service industries of Canada between the size of the seasonal swings in employment and the size of the industry average hourly wage rate. Again it is the Personal Services which have the largest fluctuations in seasonal variability along with corresponding small hourly wage rates. As was found in the previous chapter, the inverse correlation is somewhat weak. A correlation coefficient of -.65 was found to exist at the 80 percent level of confidence.

The Cyclical Factor

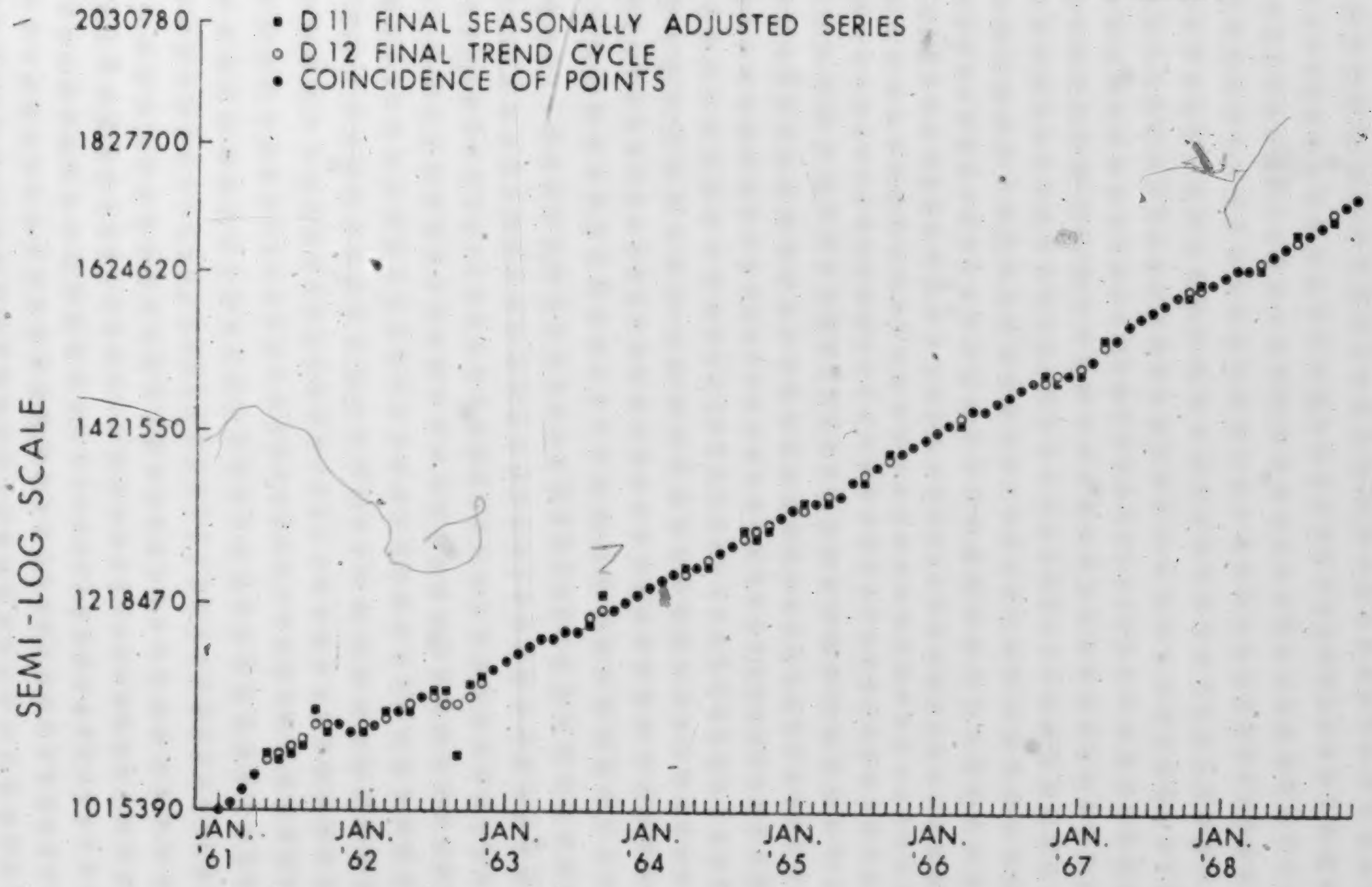
The growth paths for the various Canadian services as defined by the Henderson moving averages in the X-11 are shown in Figures 24 to 27. They are summarized in Table 24.

The cyclical growth of the Community, Business and Personal Services in Canada with a rate of 72.7 percent is just a little less than that of its Alberta counterpart. The growth of the cyclical factor is almost a perfectly straight line with a positive slope.

Business Services in Canada grew by 81.7 percent over the time span 1961 to 1968. While the Personal Services had a growth rate of 52.6 percent over the same time span, that of its subgroup, Hotels, Restaurants and Taverns had the highest growth rate of the sectors examined in this chapter with a rate of 87.9 percent.

FIGURE 24

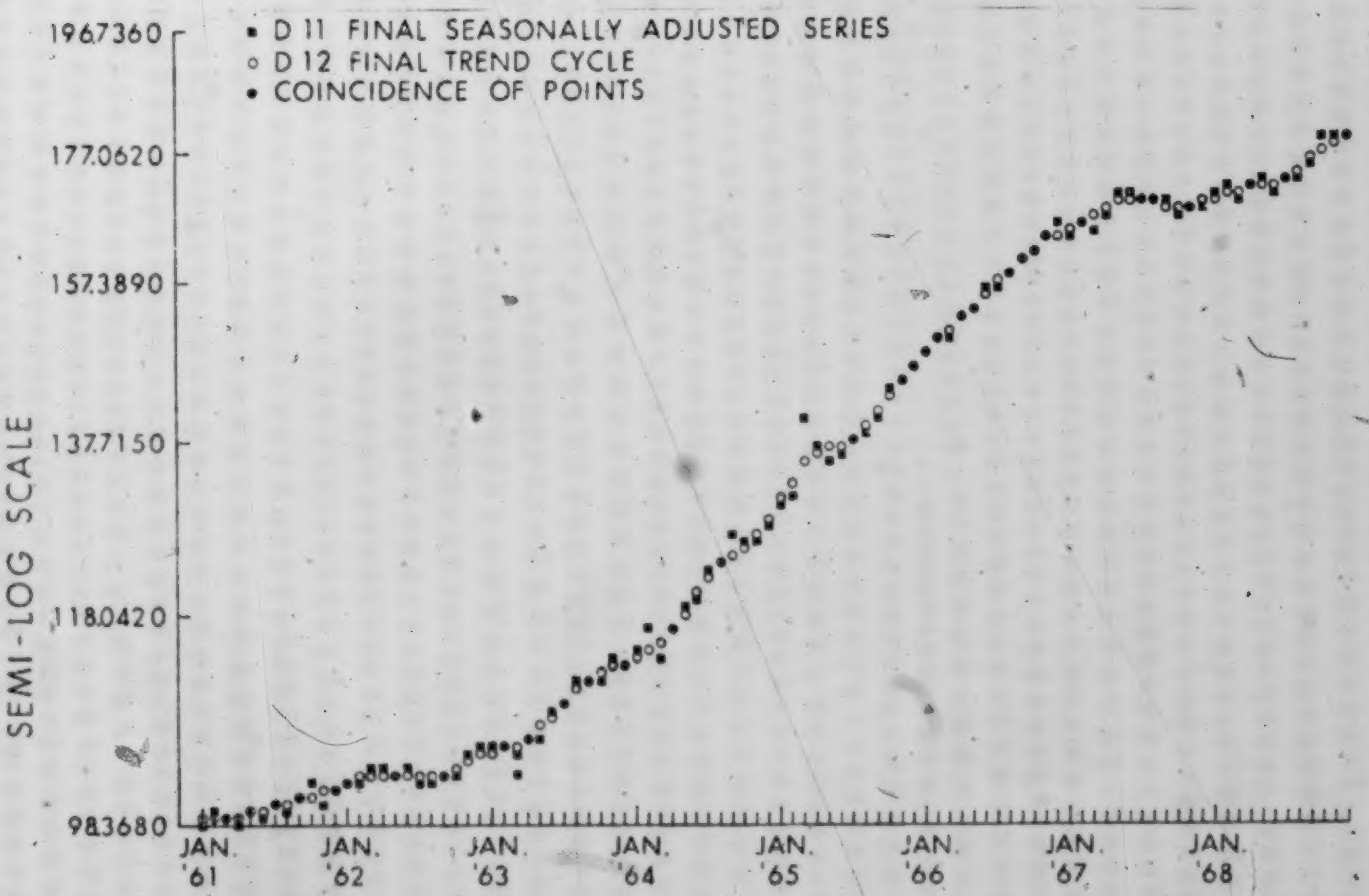
Cyclical Factor, Community, Business and Personal Services, Canada, 1961-1968



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968

FIGURE 25

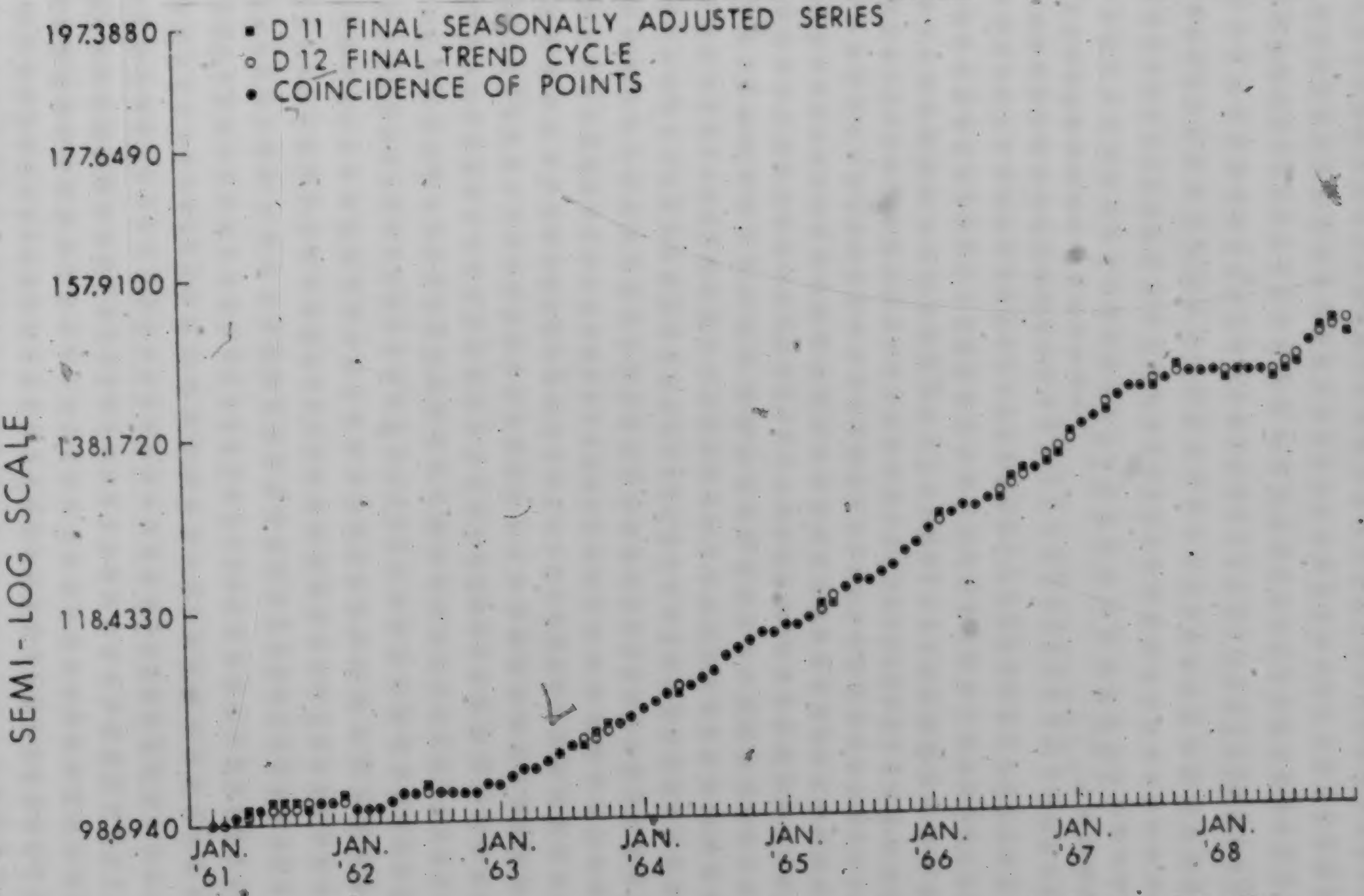
Cyclical Factor, Business Services, Canada, 1961-1968



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 26

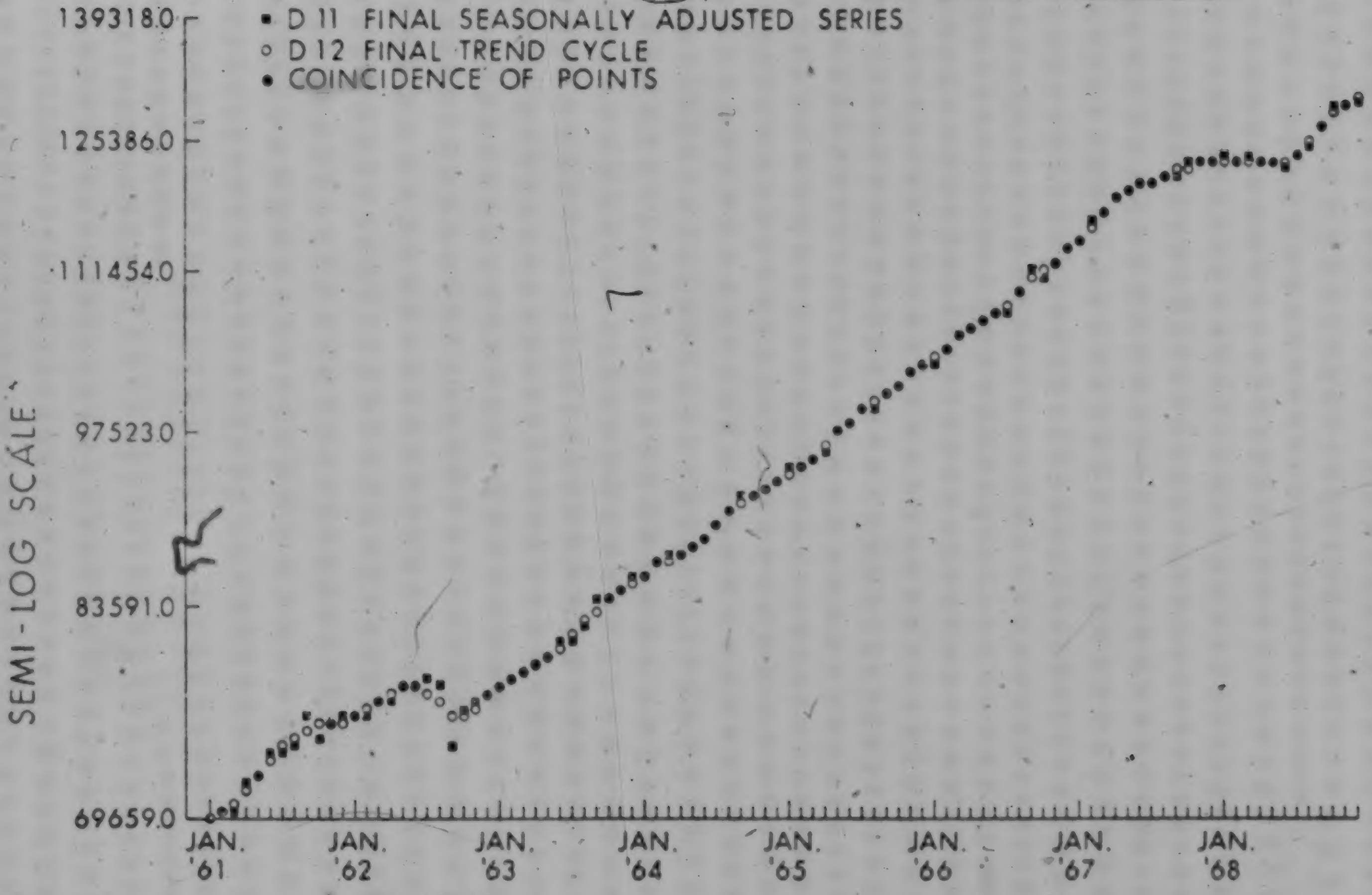
Cyclical Factor, Personal Services, Canada, 1961-1968



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

FIGURE 27

Cyclical Factor, Hotels, Restaurants and Taverns, Canada, 1961-1968



Source: Calculated from Statistics Canada, Employment Earnings and Hours, Cat. No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960 - December, 1968.

TABLE 23

LINEAR CORRELATION COEFFICIENT: SEASONAL VARIABILITY OF EMPLOYMENT AND INDUSTRY HOURLY WAGE, CANADA SERVICES

Industry	Percentage Seasonal Variation, 1969	Average Industry Hourly Wage, 1970
Community, Business, Personal Services	2.7	$3.50
Business Services	5.6	4.67
Personal Services	9.9	2.32
Hotels, Restaurants	12.0	2.76

Linear Correlation Coefficient: -.65

Calculated T-Value: -1.20

T-Value at .80 Level: -1.061

Conclusion: Reject Ho:p = 0 at .20 level.

TABLE 24

GROWTH OF THE HENDERSON-DERIVED CYCLICAL FACTOR, CANADA SERVICES, 1961-1968

	Percent Growth Rate, 1961-1968 Cyclical Factor
Community, Business and Personal Services	72.7
Business Services	81.7
Personal Services	52.6
Hotels, Restaurants and Taverns	87.9

Source: Calculated from Statistics Canada, Estimates of Employees by Province and Industry, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969, and Employment Earnings and Hours, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1968.

CHAPTER VI

THE SEASONAL FACTORS OF THE COMMUNITY, BUSINESS AND PERSONAL SERVICES: AN OVERVIEW

The Small Firm and the Excluded Services

It is evident that the service industries of Alberta are accounting for a progressively larger share of employment, and that their seasonal factors appear to be quite stable over the duration of this study. In addition, the amplitude of seasonal fluctuations in the Community, Business and Personal Services is the smallest of all of the sectors examined. However, the seasonal amplitudes for some of the subcategories are larger than the sum of the parts for this industry grouping. This phenomenon may originate with the use of both the small firm data, Statistics Canada Publication 72-508, and the large firm data, Statistics Canada Publication 72-002.

Therefore a possible reason for the difference in the seasonal factors of the sum and the components of the Community, Business and Personal Services may be due to what could be termed a small firm phenomenon. It is possible that an owner-managed firm may work many overtime hours to meet a seasonal increase in demand. This may be done because it may be less expensive than hiring additional staff. Or it is possible that a small service firm may choose simply not to meet a seasonal increase in demand. Either type of behavior would manifest itself in a smaller employment seasonal factor for an all size firm survey, but in greater seasonal fluctuations for a large firm survey.

However, credible this may be, there is a second possible reason for the differences in amplitude of the seasonal factors. The Community Business and Personal Services as tabulated in Statistics Canada Publication 72-508 comprise all the services in Standard Industrial Classification (SIC) numbers 801-899. The component services for Alberta obtained from Publication 72-002 are the Business Services, SIC 851-869, the Personal Services, SIC 871-886 and its largest subcategory, Hotels, Restaurants and Taverns, SIC 881-886. It is apparent that not all sectors have been accounted for in Publication 72-002. Those not included are the Education, Health and Religious Services, SIC 801-831, Recreation Services, SIC 841-849 and Miscellaneous Services, SIC 891-899.

Altogether, the Community, Business and Personal Services account for 24.5 percent of Alberta's 1971 employment. However, in taking the component services from Publication 72-002, only 8.2 percent of total employment is being considered, or put another way, only 33.5 percent of the Alberta Community, Business and Personal Services. The conclusion to be drawn from this is that the relatively smaller seasonal factors calculated from the all size firm data may be due to the characteristics of employment in the excluded services sectors. That is, employment in the Education, Health, Religious, Recreation and Miscellaneous Services may all be less influenced by seasonal variation than employment in the Business or Personal Services.

Further testing to determine which of the two explanations is more valid is difficult. Dealing with the small firm explanation first, it is possible that if seasonal factors for the large firms of SIC 801-899 could be calculated and compared to those factors for all size firms, or even better small firms only, the answer would become evident.

Unfortunately this is not possible for a number of reasons. Firstly, Statistics Canada Publication 72-002, which is the large firm survey, does not include data for SIC 801-840. In fact, for Alberta no figures for the Recreation and Miscellaneous Services, SIC 841-849 and 891-899, are published. This means that the large firm data would be incomplete.

Secondly, small firm data are not published on a monthly basis. The only time these data have been published is with every decennial and quinquennial census, in addition to some occasional tabulations. Thirdly, the data used in this project for the comprehensive all size firm analysis were obtained from the occasional Statistics Canada Publication 72-508, which does not disaggregate the Community, Business and Personal Services into their component services. This is not possible to compare seasonal factors for the available large firm services subgroups to either a small firm or comprehensive firm subgroup of services.

Seasonal problems arise if the excluded services explanation was to be tested. Although all of the services subcategories are fully published with every census, they are not released on a monthly basis. The large firm survey Publication 72-002 does not list services in SIC 801-840, or even Miscellaneous Services SIC 891-899, for Alberta. The comprehensive Statistics Canada Publication 72-508 does not disaggregate the Community, Business and Personal Services into its component services. This means that it is not possible to calculate seasonal factors for the excluded services. The question as to which of the two explanations is the more tenable must remain unresolved until Statistics Canada publishes more data on the service industries.

The Seasonal Factors for Alberta and Canada

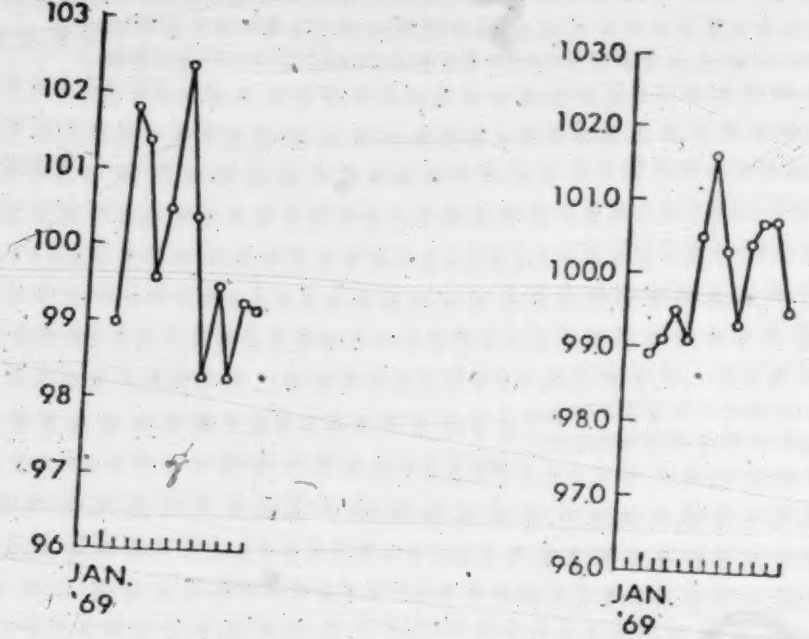
Figures 28 and 29 show a side by side comparison of the final seasonal factors for the Community, Business and Personal Services for both Alberta and Canada. For the Personal Services and for Hotels, Restaurants and Taverns it is seen that the pattern of seasonal timing is very similar with the months of July and August achieving seasonal peaks and December and January with seasonal factor lows. The major difference between the Alberta and Canada seasonal factors is that for Alberta the Personal Services and Hotels, Restaurants and Taverns exhibit seasonal factor swings of 22.0 and 24.5 percent respectively, while the same services for Canada vary by only 10.3 and 12.1 percent.

The amplitudes of the seasonal factor for the Business Services of Alberta and Canada exhibit the same behavior. The variation in the seasonal factor is only 5.7 percent for Canada, while that for Alberta is 10.4 percent. However, the seasonal patterns do not appear at all alike. The seasonal factor low reached in January for Canada is not reached until May for Alberta.

It is difficult to say what causes this large swing. It is certain what is not causing it. The seasonal factors for the other Alberta services examined do not display this large upward movement between January and February. Therefore this is not caused by the large firms of the Business Services, Personal Services nor the Hotels, Restaurants and Taverns. The possibility exists that this fluctuation is caused by the small firms operating in these service sectors. That would indicate that the small firm's explanation is without merit. The other possible explanation is that this movement is caused by those service industries

FIGURE 28

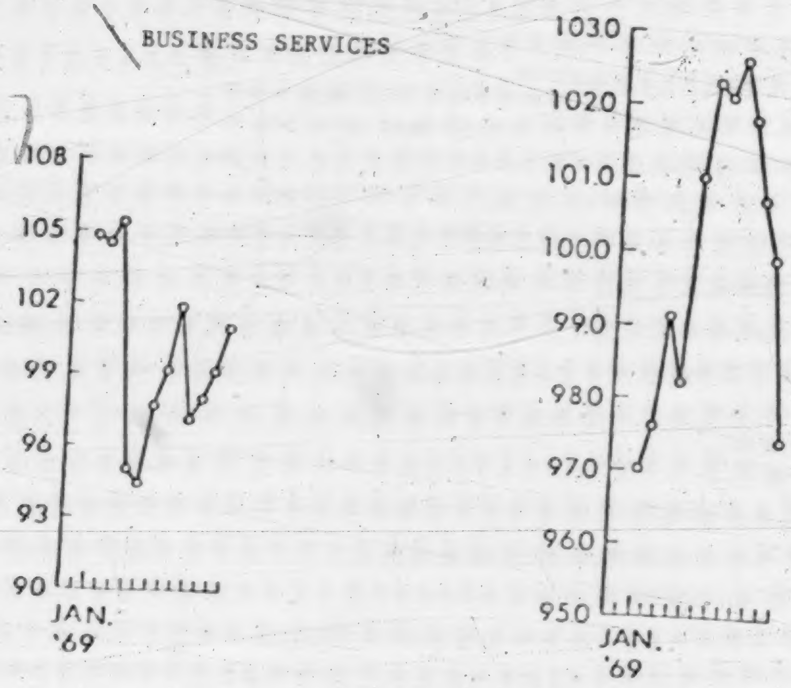
Final Seasonal Factors, Alberta and Canada, 1969: Community Business and Personal Services and Business Services



Alberta

Canada

BUSINESS SERVICES

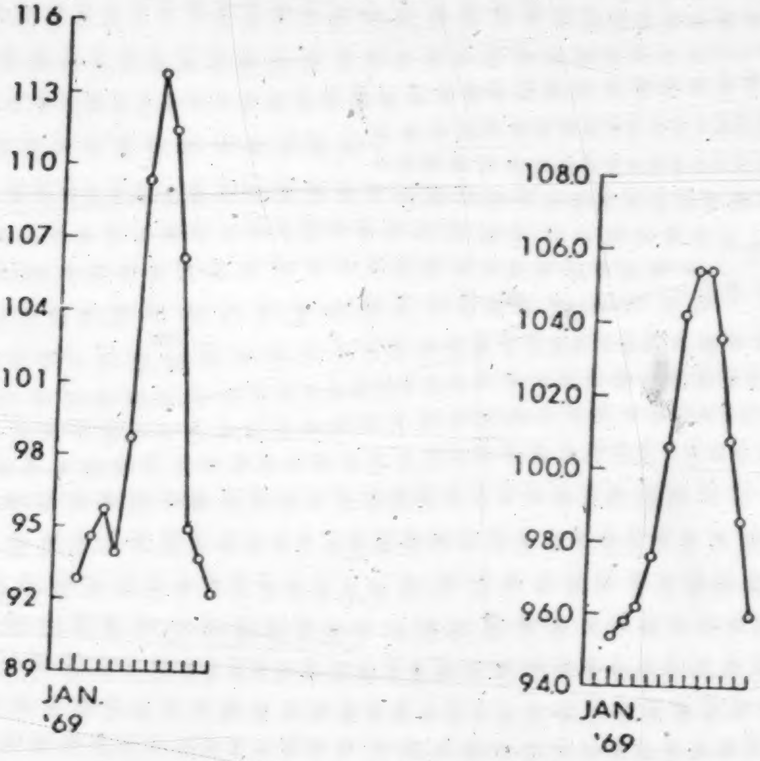


Alberta

Canada

FIGURE 29

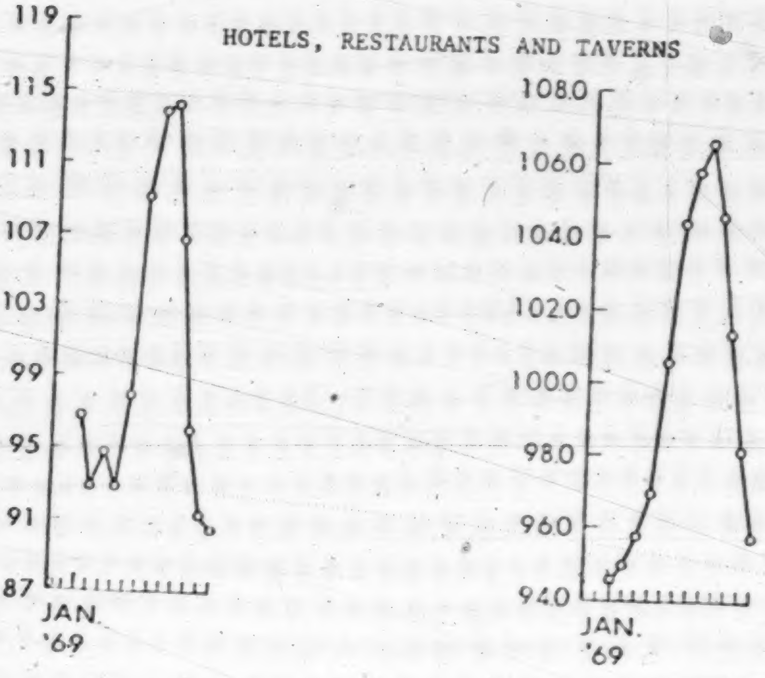
Final Seasonal Factors, Alberta and Canada, 1969: Personal Services and Hotels, Restaurants and Taverns



Alberta

Canada

HOTELS, RESTAURANTS AND TAVERNS



Alberta

Canada

for which it is not possible to calculate seasonal factors, particularly the Education, Health and Religious Services.

At the level of aggregation used in this project it is difficult to account for the apparent differences in the patterns of the seasonal factors displayed. In order to be able to do this, it is imperative that each service subcategory be disaggregated into its component parts and the seasonal factors for each component carefully examined. Business Services, for example, would have to be decomposed into employment time series for accounting firms, advertising agencies, engineering services and so forth, and seasonal factors calculated for each. Only in this way could the pattern of the seasonal factor for the aggregate be fully explained. Unfortunately, this is not possible at this time. No such data are available. The Business Services for Alberta also have seasonal factor peaks in March, while that for Canada peaks in August. For the Canadian Services, a seasonal decline starts immediately after the achievement of this peak to continue to the factor low, while for Alberta there is a decline from August to September, the seasonal factor then increasing steadily to reach its March maximum.

It is tempting to conclude that seasonal variation in employment for Alberta's Business Services is different from that of Canada as a whole. While this is undoubtedly true for the larger service firms which are represented by this seasonal factor, the addition of smaller sized firms, which would be more representative of Alberta businesses, might well change the seasonal pattern for the province to correspond more closely to the national aggregate.

The Community, Business and Personal Services present the most perplexing seasonal factors. Little similarity is seen between the seasonal factors for Alberta and Canada except for the fact that both display the smallest variability of all sectors analyzed. For Canada this is a low figure of 2.6 percent, while for Alberta the figure is 4.0 percent. Both seasonal factors reach maximum values in June. However, Alberta achieves its seasonal low in August and October, while Canada has its minimum value occur in January. The largest consecutive upward seasonal swing in both series terminates at the month of June and the largest downward seasonal swing in both runs from June to September. Alberta's Community, Business and Personal Services also exhibit a large upward swing from January to February.

Trend or Time Conditioned Seasonal Factors

At the start of the project it was not known whether the seasonal factors calculated for the Community, Business and Personal Services would show movement over time. Stable seasonal factors had been calculated by Statistics Canada in earlier years, but Daly subsequently found that moving seasonal factors provided a better explanation of the behavior of some Canadian economic time series. While the X-11 program makes allowance for the calculation of time conditioned moving seasonal factors, none were found in this project. The F test clearly showed all employment sectors examined to have stable seasonal factors over the duration of this study.

The X-11 also showed that employment in the service industries was increasing at rates double those of the goods sectors during 1961-1968 as calculated by the Henderson derived cyclical factor. The fact that the F tests indicated stable seasonality would give rise to strong suspicion that the observed seasonal factors for the services were not trend conditioned during this time period.[35]

Summary of Findings

A number of conclusions are evident from the analysis of the preceding chapters:

(a) The Community, Business and Personal Services of both Alberta and Canada showed the least seasonal variation in employment of all the industries examined.

(b) The Alberta industries of Manufacturing and Transportation, Communication and Utilities showed less seasonal variation in employment than the Business Services, Personal Services and Hotels, Restaurants and Taverns for Alberta.

(c) The available data show that Alberta has twice the seasonal amplitudes in employment than exist for comparable Canadian service industries. Because of a lack of data, further testing to determine why is not possible at this time. Potential explanations could involve the fact that Alberta service firms may work fewer overtime hours, have a lower degree of fixity in their workers, are subject to greater seasonality in the product market than Canadian firms, or make more effort to meet seasonal increases in demand than the latter.

---

[35] Fuchs has found that employment in the services is more stable than in goods producing sectors over the course of a business cycle. For the period 1947-1965, Fuchs discovered that during periods of economic expansion employment in the services in the United States increased by an average of 2.9 percent, while employment in Industry increased by 3.2 percent. However, during periods of decline, Services still managed to eke out average increases in employment of .7 percent, while Industry only managed a negative growth rate of 8.3 percent. See V.R. Fuchs, The Service Economy, National Bureau of Economic Research, New York, 1968, p. 167.

(d) The available data show that large firms are more subject to seasonality in employment than small firms. Possible reasons to explain this behavior could involve the fact that large firms may work fewer overtime hours, are subject to more seasonality in the product market, attempt to meet seasonal demand shifts more vigorously, or have a lower degree of fixity in their workers.

(e) The seasonal factors for all the industrial sectors examined for Alberta and Canada do not appear to be trend conditioned over the duration of the study.

(f) The seasonal factors for all the industrial sectors examined for Alberta and Canada were found to be stable over the duration of the study.

(g) An inverse correlation was found to exist between seasonal variations in employment and average industry wage rates.

A lack of data prevented the testing of a number of hypotheses which could have explained the observed results. In order to examine the service industries more rigorously, the following data would be required:

(a) wage rates by occupation by industry on a monthly basis;

(b) training and turnover costs of workers by industry;

(c) experience and skill of workers by industry;

(d) sales for all service firms on a monthly basis;

(e) employment for both small and large firms on a monthly basis;

(f) number of overtime hours worked by industry on a monthly basis.

The availability of data for the first three items would allow for the more rigorous testing of Alberta's services with respect to Oi's findings. Sales data would enable not only the identification of seasonal shifts in demand, but also the amplitude and duration of the change. The employment time series differentiated by firm size would allow the testing of whether or not seasonal variations in employment differ accordingly. Tests could also be done as to whether a firm reacts to a seasonal shift in demand by hiring additional workers, by scheduling overtime hours for its existing workers, or by simply choosing not to meet a seasonal increase in demand.

Counteracting Seasonality: Government Solutions

The Canadian government is very aware of seasonal fluctuations in employment and has a long history of wrestling with the problem. As far back as the 1940's, the Unemployment Insurance Commission of Canada attempted to combat seasonality in employment with the "Find A Job Week" program. Because of the success of this program, in 1950 the UIC instructed its offices to promote the establishment of local committees to look into the problems of seasonality.

In 1954, Labor Canada and the Unemployment Insurance Commission merged various local campaigns into a national winter unemployment program which was designed to inform the public about the seasonal employment problem, and to stimulate those industries plagued by seasonal variations in employment. Under the slogan of "Do It Now," an attempt was made to have work normally done in the summer in Canada shifted to the winter months. The program made extensive use of newspapers, magazines and radio and television advertising to get the message across. Surprisingly enough, publicity expenditures from the private sector turned out to be far greater than those of the government of Canada. In 1955, the Federal government attempted to offset winter unemployment further by instructing all of its departments to schedule programs so as to counteract seasonal variations in employment.

As the problem of seasonality in Canada became progressively worse in 1958, a National Winter Employment Conference was held, attended by all the provinces, labor organizations and national associations in an effort to find solutions to the problem. Delegates at the Conference were divided into various groups, each meeting separately and reporting to a plenary session. At this session the government group recommended:

(a) municipal and provincial committees be set up to develop measures for creating winter jobs;

(b) overtime be discouraged during periods of high employment, in order to spread out employment over the year;

(c) the seasonally unemployed by given extensive trade training to enhance their prospects of obtaining employment.

The trade and commerce group recommended that:

(a) financial incentives, such as accelerated depreciation allowances, be given to business firms to encourage capital outlays during the winter months;

(b) winter vacations be encouraged in Canada;

(c) expenditures on home improvements also be encouraged during the winter months.

In addition, the promotion and publicity group recommended that:

(a) existing promotional and publicity campaigns be intensified;

(b) an intensified personal selling campaign be started.

As a result of this Conference, a number of measures were undertaken by the Federal and Provincial governments to counteract seasonality. In the winter of 1958-59, the province of Nova Scotia undertook a program that paid municipalities 50 percent of the labor costs for the repair and renovation of public buildings, the improving of reservoirs and the erection of traffic signs and street lighting. The Alberta government spent $2 million at this time to build roads in the winter season, with the sole purpose of alleviating seasonal unemployment.

In 1958, a Municipal Winter Works Incentive Program was proposed by the Federal government, which would pay 50 percent of the labor costs of construction projects carried out by municipalities during the winter months. Workers eligible for these projects were all those who were unemployed, or who would have been unemployed, had these projects not been started. The Winter Works program was accepted by all of Canada's provinces. In addition, Ontario, Alberta, Saskatchewan and Prince Edward Island contributed an additional 25 percent to the labor costs of the projects, while Manitoba contributed an additional 30 percent. By the year 1964, the Federal government's contribution had been raised to 60 percent for those areas which suffered more from seasonality than others.

In 1963, a direct payment of $500 was made under the Winter House Building Incentive Program by the Canadian government to buyers of winter built homes. The National Housing Act was also modified to offer Home Improvement Loans and Small Business Loans were also made more readily available. Much of the government's effort went into making the Canadian consumer conscious of the seasonal problem, and the "Do It Now" Program became one of Canada's largest publicity programs, at a cost of four million dollars - 90 percent of which was contributed by the private sector.

The primary purpose of these programs was to reduce the seasonal variation of employment in Canada's Construction Industry. Their effectiveness was difficult to measure, but Labor Canada feels that they did succeed in reducing the amplitude of seasonal variations. While seasonal variation in employment can probably not be completely eliminated, it was nevertheless found possible to reduce its influence.

Although seasonal unemployment moderated during the last half of the 1960's, by the early 1970's Canada's unemployment rate had again risen to a level of six percent, which was deemed unacceptable by the Federal government. The government decided once more to become actively involved in creating employment for Canadians out of work. As a result, the Local Initiatives Program was legislated into existence in October of 1971. The sole purpose of the Local Initiatives Program was "directed to alleviating high seasonal unemployment throughout the country by enabling individuals and groups to implement innovative projects which (would) create jobs and benefit their communities."[36]

The Federal government realized that the old form of make-work programs which had worked so well in the past, would no longer be suitable in the 1970's. Labor was more concerned with alienation from society, about meaningful work and participation in society, and staunchly opposed to the decision making of centralized bureaucracies which they felt had little or no knowledge of the communities whose futures were at stake.

---

[36] Department of Manpower and Immigration, The Local Initiatives Program - Guide to Applicants, Ottawa, 1976, p. 1.

Therefore, the basic idea behind the Local Initiatives Program was to give workers public money in order to do the things they felt to be worthwhile. It allowed them to work together to develop their own proposals for winter employment. The philosophy behind LIP was lifted from the Opportunities for Youth Program, which had proven successful in creating winter employment when initiated in the summer of 1971.

Under LIP, projects can be sponsored by either municipalities, citizens' groups, social agencies or individuals. There is no limit to the type of project that can be proposed. They can range all the way from construction to arts and crafts projects, and from social services to research. However, the projects must provide employment be of benefit to the community and be non-profit in nature. During the first winter of LIP, namely 1971-72, the government found it necessary to increase the original $100 million budget to $150 million because of Canadians' response to the program. More than 92,000 jobs were created during this period.

Due to the unanticipated barrage of applications in the winter of 1972-73, it was decided to increase the original budget of $85 million to $206 million, in an attempt to accommodate all applicants. More than 15,000 applications were received by the Job Creation Branch of the Department of Manpower and Immigration, which was charged with the responsibility of administering the program. About 90,000 new jobs were created that winter. One of the major changes in the 1972-73 program was to consider municipal and private applications on an equal basis. In 1971-72, $50 million had been set aside for grants to municipalities, to emphasize the difference between the Local Initiatives Program and the Municipal Works Incentive Program. The effect of this decision was to reduce the number of construction projects carried out in the winter months in the various municipalities under the benefit of federal grants.

Because the seasonal unemployment problem in 1973-74 had abated considerably, the LIP budget was cut back to $73 million. Nevertheless the program was successful in creating 30,000 new jobs. One of the changes made in LIP during this year of operation was to stagger the dates of the various projects financed to offset the time when unemployment was the highest in a specific area. During the 1974-75 program, the total budget allotted for LIP amounted to $84 million, which saw the creation of 30,000 new jobs. Grants for that year were distributed on an allocation of $262 for every person unemployed beyond a four percent unemployment rate in each federal riding.

Creating jobs through government administered programs is neither easy nor inexpensive. It is probably cheaper and more efficient to pass along the financial benefits of these programs directly to the unemployed, without building the machinery necessary to administer job creation programs. The Economic Council of Canada suggests that the LIP grants have had little effect as a contraseasonal program.[37] It felt that similar effects on the unemployed could have been achieved through an increase in government expenditure or an appropriate decrease in taxes.

---

[37] The Economic Council of Canada, People and Jobs: Summary and Recommendations, Ottawa, 1976, p. 17.

Counteracting Seasonality: Business Solutions

Seasonal factors calculated by Labor Canada have shown that large seasonal fluctuations exist in some Retail Trade subcategories such as car dealers and clothing stores. Smaller seasonal fluctuations have also been observed in the employment series of department stores and supermarkets.[38] While the changing seasons no doubt affect the quantity and style of goods sold in retail outlets - and recognizing that it is difficult to exert control over the weather induced changes - it is nevertheless possible that aggressive pricing policies may diminish the influence of the seasonal factor on some retail trade firms. It is also possible for large firms to minimize the effects of seasonal variation in retail trade by moving staff from one department to another. And even during periods of low activity some firms will retain experienced staff, feeling that the costs incurred at this time are more than offset by the fixed employment costs of hiring and training new staff when seasonal peaks in activity are approached.

The Hotel industry exhibits seasonal fluctuations in employment largely due to changes in demand. Demand in turn is influenced by the number of holidays in a year, by the length of the average vacation, as well as by the location of an individual hotel. In order to counteract the effects of seasonality, a number of methods have been adopted by this industry. Hotels have been successful in keeping their rooms occupied during the off-season by offering lower winter rates and through booking business conventions. Staff are also encouraged to take holidays during the slack business periods. Firms can also undertake counterseasonal activities to extend their period of operation. For example, the Banff Springs Hotel is now open on an all-year basis, both summer and winter. And some of the larger resorts that offer skiing facilities in the winter now stay open in the summer to feature fishing, canoeing, trail riding, back packing, camping and other recreational activities.

---

[38] Labor Canada, Seasonal Unemployment in Canada, Economics and Research Branch, Ottawa: Queen's Printer, 1954, pp. 45-6.

These are some methods used successfully by business firms in the short run to moderate the effects of seasonality. In the long run, technological changes and innovation may well serve to minimize the effect of seasonal variability on the economy. Although these changes may increase the ability of such industries as Construction and Transportation to operate during Canada's severe winters, they cannot moderate the seasonal changes caused by such things as consumer buying habits. This can only be accomplished through a program of extensive publicity. Advertising campaigns have been extremely successful in telling consumers what to buy. Perhaps a campaign telling them when to buy is needed as well.

Economic Costs of Seasonality in Employment

Although relatively large seasonal variations in employment may exist in a particular industry, it does not necessarily follow that the presence of this seasonality will result in the imposition of economic hardships on an individual worker. To examine this question more closely, two separate cases can be distinguished.

In the first instance, a worker may be faced with the choice of taking a seasonal job or a non-seasonal job. If the worker takes the former of his own free will, then serious questions must be raised as to why he should be entitled to unemployment benefits during the off-season. What distinguishes him from the non-seasonal worker is only that his periods of work and leisure are clumped together, instead of being evenly distributed over the course of the year. It is not inconceivable that in his job as a seasonal worker, his annual income may be such that it places him in the upper part of the income distribution. No financial hardship may result from the seasonality in his employment.

In the second instance, the worker may be employed in a low paying seasonal job and in keeping with his skills and work experience attempt to obtain work in another area of the country in an effort to improve his financial position. If he moves to an industry in a higher wage area, but is unable to obtain employment because of a lack of jobs, then he will encounter economic hardship and require transfer payments in order to survive. In this case the worker's dilemma can be considered a subset of the larger problem confronting Canada's low income recipients.

In the latter case the solution to the problem is for the economy to provide more jobs to relieve the economic hardship imposed on the worker, with transfer payments fulfilling the function of supplying temporary financial assistance. In the first case, however, provided a worker has opted for a seasonal job of his own free will, he will undoubtedly expect some unemployment during the off-season. It is not at all clear that in this instance he should also be entitled to receive unemployment benefits.

It is also conceivable that there may be non-pecuniary costs to the worker arising from his seasonality in employment. Should the seasonal worker choose not to work during the off-season, then there may be implications for the social and psychological costs of his idleness. It may very well be that these long periods of inactivity could pose serious problems for both the individual worker and society at large.

Conclusion

Kuznets suggests that it is possible to minimize seasonal variations in employment by moving surplus labor from one industry to another by the careful timing of industrial activities.[39] However, this is not without its problem. For one thing, manpower resources transferred in this fashion may not be properly trained to function efficiently in an industry requiring different skills. In addition, in a free market economy firms may refuse to time their activities so as to coincide with those of another in a different industry. And it must also be remembered that labor is not likely to relocate at any great distance to obtain work for a short period of time. The mobility of workers is inhibited by economic, social and institutional factors.

---

[39] S. Kuznets, Seasonal Variations in Industry and Trade, National Bureau of Economic Research, New York, 1933, p. 353.

It has traditionally been assumed that labor is the more mobile factor of production. However, the role of labor vis a vis easy mobility is changing slowly over time. Contractual commitments between employers and workers may now guarantee not only wages and fringe benefits, but also the duration and terms of employment. And as output declines in the economy, firms may find that they are not able to lay off workers as they once could due to the increasing specialization of labor. It may be that almost as many workers are required to maintain a plant or technical facility when sitting idle as when in full production. Firms may also be reluctant to discharge excess labor during seasonal decline in demand because of the costs involved in discharging workers and their subsequent rehiring. The increasing human capitalization of experienced workers also presents a substantial barrier to quick lay-offs. It may prove less expensive for a firm to keep excess labor resources than to hire new employees later on and have to put these through a rigorous and time consuming training period.

Short term solutions to the problem of seasonality in employment will probably depend on legislative action taken by the government. Long term solutions are more difficult to come by. Most seasonal problems in Canada are brought about by the severe climate about which little can be done, with the exception of changes brought about by future technology and innovation. Technical innovations have now made it possible for the Construction and Fishing Industries to operate throughout a longer season in Canada. Attempts could also be made by both government and business to reduce the amplitude of the seasonal factor of those industries most affected by seasonality. It may also be possible to shorten the period of the seasonal lay-off in certain industries and in so doing extend the season itself. For example, with the advent of all weather transportation systems, the Recreation and Tourism industries in Alberta's mountain areas have undoubtedly been able to extend their normal operating season.

It has been argued that policies designed to keep the economy growing will minimize the problem of seasonal swings in employment. If seasonal factors were trend conditioned, they would attain minimum values during periods of strong cyclical growth. However, during the cyclical upswing of economic activity in Alberta for the period 1961-68, all of the seasonal factors for the industries examined remained stable over time. Anticipating the continued dominance of the Service industries in future labor forces, it will be interesting to follow the movements of the Canadian and Alberta seasonal factors over longer periods, to see if their behavior continues to be independent of both trends and time.

BIBLIOGRAPHY

Bonin, J.M., and Davis, W.Y., "Labor Force Responsiveness to Short Run Variations in Economic Opportunity," Southern Economic Journal, Vol. 38, October, 1971, pp. 161-172.

Bourque, P.J., "Seasonal Variation and Economic Stability," Proceedings of the Annual Conference of The Western Economic Association, 1959, pp. 34-42.

Chiswick, B.R., "The Effect of Unemployment Compensation on a Seasonal Industry: Agriculture, " Journal of Political Economy, Vol. 84, 1976, pp. 591-602.

Dagum, E.B., "A Note on the Seasonal Adjustment of Economic Time Series," Canadian Statistical Review, Catalogue No. 11-003, Ottawa: Industry, Trade and Commerce, August, 1974, pp. 4-116.

Daly, D.J., "Canadian Experience with Seasonal Adjustment," Seasonal Adjustment on Electronic Computers, OECD, Paris, 1960, pp. 151-177.

Durand, J.D., The Labor Force in the United States, 1890-1960, Social Science Research Council, New York, 1968.

Economic Council of Canada, People and Jobs: Summary and Recommendations, Ottawa, 1976.

Fleisher, B.M., Labor Economics Theory and Evidence, New Jersey: Prentice-Hall, 1970.

Foster, H.D., "Labor Force Adjustments to Seasonal Fluctuations in Construction," Industrial and Labor Relations Review, Vol. 23, 1970, pp. 528-540.

Fuchs, V.R., The Service Economy, National Bureau of Economic Research, New York, 1968.

Garbarino, J.W., "Fringe Benefits and Overtime as Barriers to Employment," Industrial and Labor Relations Review, Vol. 17, 1963/64, pp. 426-442.

Industry, Trade and Commerce, Economics Branch, Recent Developments in Processing Seasonally Adjusted Data, Ottawa: Queen's Printer, 1956.

Kuznets, S., Seasonal Variations in Industry and Trade, National Bureau of Economic Research, New York, 1933.

Labor Canada, Economics and Research Branch, *Seasonal Unemployment in Canada*, Ottawa: Queen's Printer, 1954.

Labor Canada, Economics and Research Branch, *The Impact of Winter on the Canadian Worker*, Ottawa: Queen's Printer, 1965.

Macaulay, F.R., "The Use of Moving Averages in the Measurement of Seasonal Variations," *Journal of the American Statistical Association*, September, 1928, pp. 241-52.

Macaulay, F.R., *The Smoothing of Time Series*, National Bureau of Economic Research, New York, 1931.

MacDonald, R.M., "The Fringe Barrier Hypothesis and Overtime Behavior," *Industrial and Labor Relations Review*, Vol. 19, 1965/66, pp. 562-569.

Merriam, I.C., "Seasonal Workers and Unemployment Compensation," *Social Security Bulletin*, September, 1938, pp. 8-15.

Oi, W.Y., "Labor as a Quasi-Fixed Factor," *Journal of Political Economy*, Vol. 70, 1962, pp. 538-555.

Persons, W.M., "Indices of Business Conditions," *Review of Economics and Statistics*, January, 1919, pp. 5-107.

Salzman, L., *Computerized Economic Analysis*, McGraw-Hill, New York, 1968.

Shiskin, J., "Decomposition of Economic Time Series," *Science*, Vol. 128, 1958, pp. 1539-1545.

Shiskin, J., *Electronic Computers and Business Indicators*, National Bureau of Economic Research, Occasional Paper No. 57, New York, 1957.

Shiskin, J., Young, A., Musgrave, B., *The X-11 Variant of the Census Method 11 Seasonal Adjustment Program*, Technical Paper No. 15, Bureau of the Census, Washington, 1967.

Statistics Canada, *Employment Earnings and Hours*, Catalogue No. 72-002, Ottawa: Industry, Trade and Commerce, January, 1960-December, 1969. (Monthly)

Statistics Canada, *Employment Indexes, Monthly and Annual Statistics*, Vol. I, Catalogue No. 72-504, Ottawa: Industry, Trade and Commerce, 1970.

Statistics Canada, *Estimates of Employees by Province and Industry*, Catalogue No. 72-508, Ottawa: Industry, Trade and Commerce, 1969.

Statistics Canada, *Historical Labor Force Statistics*, Catalogue No. 71-201, Ottawa: Industry, Trade and Commerce, 1975.

Stigler, G.J., Trends in Employment in the Service Industries, National Bureau of Economic Research, New York, 1956.

U.S. Congress, Joint Economic Committee, The Extent and Nature of Frictional Unemployment, Bureau of Labor Statistics, 86 Cong., 1st sess., November 19, 1959.

Worton, D.A., "The Service Industries in Canada," Production and Productivity in the Service Industries, V.R. Fuchs, ed., New York, 1969.

Woytinski, W.S., Seasonal Variations in Employment in the United States, Social Science Research Council, Washington, 1939.

APPENDIX

Total Non-Agricultural Labor Force - Alberta 72-508

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	283300.	282400.	284000.	285000.	304700.	316000.	318700.	319300.	318200.	314000.	308500.	300300.	3634400.
1962	296800.	295200.	300500.	302000.	311500.	325600.	332900.	332200.	330100.	324600.	320900.	315800.	3788100.
1963	309200.	310700.	309700.	307800.	322700.	332000.	333300.	331100.	332400.	330000.	329100.	324700.	3872700.
1964	324400.	325500.	323200.	321900.	334900.	346300.	352000.	350500.	349800.	347200.	346900.	338800.	4061400.
1965	341400.	344600.	345100.	340900.	356500.	369800.	373700.	376000.	370300.	369700.	368800.	363800.	4320600.
1966	359300.	367300.	369300.	368300.	377100.	390600.	395500.	393600.	393400.	390100.	387900.	385400.	4577800.
1967	391400.	392900.	400700.	393200.	408900.	422400.	426300.	424200.	423100.	416700.	418100.	411700.	4929600.
1968	411000.	414500.	416100.	415100.	426500.	437400.	438500.	435700.	436500.	435500.	443500.	435400.	5145700.
AVGE	339600.	341638.	343575.	341775.	355350.	367513.	371363.	370325.	369225.	365975.	365463.	359488.	

TABLE TOTAL- 34330000. MEAN- 357604. STD. DEVIATION- 44785.

Community, Business, Personal Services - Alberta 72-508

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	80000.	80700.	81200.	81600.	85000.	84800.	84100.	83900.	84900.	84700.	85800.	84300.	1001000.
1962	84400.	85000.	86500.	84900.	84600.	88800.	88100.	87600.	88500.	88300.	89900.	89300.	1045900.
1963	90100.	91800.	91300.	90600.	91400.	92800.	92000.	91100.	92600.	94200.	95100.	94800.	1107800.
1964	95600.	97000.	96500.	95500.	96700.	99200.	99400.	99400.	101000.	101600.	102900.	102500.	1187300.
1965	103700.	105800.	106100.	103600.	106000.	109200.	107000.	106900.	106800.	107100.	108500.	108100.	1278800.
1966	108100.	113700.	113200.	113700.	112200.	116000.	116000.	113900.	116500.	115600.	116100.	117000.	1372000.
1967	124500.	126300.	131800.	127100.	131900.	132100.	130600.	127300.	132400.	130700.	133900.	135100.	1563700.
1968	133900.	137800.	136600.	135700.	138600.	143500.	140400.	139300.	141500.	143300.	149600.	146500.	1686700.
AVGE	102538.	104763.	105400.	104088.	105800.	108300.	107200.	106175.	108025.	108188.	110225.	109700.	

TABLE TOTAL- 10243200. MEAN- 106700. STD. DEVIATION- 19385.

Manufacturing - Alberta 72-508

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	35800.0	36000.0	35600.0	33400.0	36600.0	38000.0	38000.0	38600.0	38300.0	37700.0	36800.0	36600.0	441400.0
1962	36400.0	36100.0	37400.0	36300.0	37800.0	39400.0	40900.0	41000.0	40800.0	40200.0	40200.0	39500.0	466000.0
1963	39700.0	39600.0	39500.0	39500.0	40900.0	41400.0	41600.0	41900.0	41700.0	40800.0	40900.0	40200.0	487700.0
1964	40900.0	41700.0	41600.0	40600.0	41400.0	42700.0	43800.0	43600.0	43900.0	42800.0	43600.0	42600.0	509200.0
1965	42700.0	42600.0	43300.0	41700.0	44100.0	45600.0	46800.0	47400.0	46100.0	46000.0	46800.0	46600.0	539700.0
1966	45100.0	44900.0	45200.0	44800.0	45600.0	46800.0	47200.0	47900.0	47500.0	48700.0	49300.0	48000.0	561000.0
1967	47600.0	47300.0	48100.0	48000.0	49200.0	49400.0	49900.0	49900.0	49200.0	48800.0	49000.0	47600.0	584000.0
1968	49600.0	49200.0	49700.0	49800.0	49900.0	50600.0	42500.0	51600.0	50400.0	50600.0	50600.0	50200.0	594700.0
AVGE	42225.0	42175.0	42550.0	41762.5	43187.5	44237.5	43837.5	45237.5	44737.5	44450.0	44650.0	43912.5	

TABLE TOTAL- 4183700.0 MEAN- 43580.2 STD. DEVIATION- 4623.9

```
                                        Trade - Alberta     72-508
B 1.  ORIGINAL SERIES
  YEAR       JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC             TOTAL
  1961   53800.0  53100.0  54800.0  55600.0  58200.0  58900.0  58700.0  59300.0  59400.0  59900.0  60200.0  61000.0          692800.0
  1962   57200.0  55900.0  57800.0  59300.0  60100.0  60900.0  60700.0  61400.0  61500.0  61200.0  61800.0  62600.0          720400.0
  1963   59900.0  53300.0  59200.0  59800.0  60300.0  61700.0  62100.0  62700.0  63400.0  63500.0  64000.0  65400.0          739300.0
  1964   61900.0  61700.0  61900.0  62400.0  63500.0  64200.0  64600.0  65000.0  65100.0  65100.0  65900.0  66600.0          767900.0
  1965   64000.0  64000.0  64100.0  66700.0  67500.0  68500.0  68800.0  69100.0  70200.0  70500.0  71400.0  72100.0          816900.0
  1966   69900.0  70100.0  71500.0  72300.0  73400.0  74700.0  74300.0  74900.0  74300.0  75000.0  76000.0  77400.0          883700.0
  1967   74500.0  73700.0  75000.0  75800.0  75100.0  78800.0  78100.0  77100.0  77500.0  78300.0  80100.0  80800.0          925800.0
  1968   77900.0  77600.0  74600.0  79500.0  80600.0  80900.0  81000.0  80000.0  80700.0  82400.0  84200.0  86100.0          969500.0

  AVGE   64762.5  64200.0  65362.5  66425.0  67462.5  68562.5  69537.5  69675.0  69012.5  69487.5  70450.0  71500.0
             TABLE TOTAL- 6516300.0           MEAN- 67878.1          STD. DEVIATION-  8254.0
```

```
                                        Transportation, Communication - Alberta     72-508
B 1.  ORIGINAL SERIES
  YEAR       JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC             TOTAL
  1961   39600.0  39400.0  39900.0  41300.0  44700.0  45900.0  46700.0  46400.0  45900.0  45200.0  43300.0  41900.0          520200.0
  1962   41500.0  41000.0  41600.0  42400.0  44500.0  47400.0  48300.0  49200.0  47900.0  45600.0  44000.0  43000.0          535400.0
  1963   42400.0  42300.0  42400.0  42900.0  46800.0  48800.0  47900.0  48700.0  47500.0  46300.0  45900.0  44900.0          546700.0
  1964   45100.0  44900.0  44900.0  45100.0  47800.0  49000.0  49800.0  50300.0  49500.0  48000.0  47500.0  46100.0          568000.0
  1965   45900.0  46200.0  45800.0  45200.0  47700.0  49000.0  49800.0  50200.0  49000.0  48300.0  47500.0  47200.0          571800.0
  1966   46300.0  46500.0  46400.0  47200.0  48600.0  49600.0  50100.0  51200.0  50300.0  49100.0  48500.0  48200.0          582000.0
  1967   47800.0  47800.0  47900.0  47700.0  50100.0  51600.0  52800.0  52900.0  51200.0  49800.0  48600.0  47000.0          595200.0
  1968   46700.0  46400.0  46700.0  47100.0  50400.0  51100.0  50000.0  50900.0  50900.0  49600.0  49000.0  47700.0          586500.0

  AVGE   44412.5  44312.5  44450.0  44850.0  47575.0  49050.0  49425.0  49850.0  49025.0  47737.5  46787.5  45750.0
             TABLE TOTAL- 4505800.0           MEAN- 46935.4          STD. DEVIATION-  2962.2
```

Total Non-Agricultural Labor Force - Alberta 72-508

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1961	96.8	96.5	96.6	96.1	100.2	103.2	104.2	103.6	103.0	101.4	100.2	98.0	100.0
1962	97.0	96.7	96.7	96.2	100.2	103.2	104.1	103.5	102.8	101.3	100.1	97.9	100.0
1963	97.0	97.0	96.9	96.3	100.1	103.1	104.0	103.4	102.7	101.2	100.1	98.0	100.0
1964	97.0	97.3	97.3	96.4	100.0	103.1	103.9	103.2	102.4	100.9	100.0	97.9	99.9
1965	97.2	97.7	97.7	96.6	100.0	103.0	103.7	103.0	102.1	100.6	99.8	97.8	99.9
1966	97.4	98.0	98.1	96.8	100.0	103.0	103.6	102.8	102.0	100.5	99.9	97.9	100.0
1967	97.4	98.1	98.3	97.0	100.0	102.9	103.5	102.7	101.9	100.3	99.8	97.9	100.0
1968	97.4	98.1	98.5	97.1	100.0	102.9	103.4	102.7	101.8	100.2	99.9	97.9	100.0

TABLE TOTAL- 9597.2 MEAN- 100.0 STD. DEVIATION- 2.6

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1969	97.4	98.2	[illegible]	97.1	100.0	102.9	103.4	102.6	101.8	100.2	99.7	97.9	100.0

Community, Business, Personal Services - Alberta 72-508

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1961	99.0	100.6	100.3	98.7	99.6	101.2	100.2	99.3	100.0	99.6	100.7	99.4	100.0
1962	99.9	100.9	100.4	98.7	99.6	101.3	100.2	99.3	100.0	99.5	100.6	99.4	100.0
1963	99.8	101.0	100.6	98.9	99.5	101.5	100.3	99.2	99.9	99.5	100.4	99.4	100.0
1964	99.6	101.2	100.7	99.0	99.6	101.7	100.3	99.1	99.8	99.2	100.1	99.3	100.0
1965	99.4	101.4	101.0	99.2	99.8	101.9	100.4	98.9	99.7	98.9	99.8	99.2	100.0
1966	99.3	101.7	101.2	99.3	100.2	102.1	100.4	98.7	99.6	98.7	99.6	99.2	100.0
1967	99.1	101.7	101.2	99.4	100.3	102.3	100.4	98.5	99.5	98.5	99.5	99.2	100.0
1968	99.0	101.8	101.3	99.6	100.4	102.4	100.4	98.4	99.5	98.4	99.4	99.2	100.0

TABLE TOTAL- 9598.0 MEAN- 100.0 STD. DEVIATION- 1.0

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1969	99.0	101.8	101.4	99.6	100.5	102.4	100.4	98.3	99.5	98.3	99.3	99.2	100.0

```
                              Manufacturing - Alberta     72-508
D10.  FINAL SEASONAL FACTORS
   YEAR       JAN      FEB      MAR      APR      MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC          AVGE
   1961       98.1     98.2     98.7     95.2     99.6   102.1   103.3   103.5   102.7   100.5    99.8    98.0         100.0
   1962       98.2     98.2     98.8     95.3     99.5   102.0   103.3   103.5   102.6   100.4   100.0    98.1         100.0
   1963       98.2     98.1     98.9     95.8     99.4   101.8   103.2   103.4   102.3   100.4   100.5    98.3         100.0
   1964       98.2     97.9     98.9     96.4     99.4   101.6   103.0   103.1   101.8   100.4   100.8    98.4         100.0
   1965       98.4     97.9     98.9     97.2     99.6   101.5   101.8   103.0   101.6   100.5   101.0    98.3         100.0
   1966       98.6     97.9     99.0     97.8    100.0   101.6   100.4   103.1   101.4   100.7   101.1    98.4         100.0
   1967       98.6     97.9     99.0     98.2    100.3   101.8    98.9   103.2   101.4   101.0   101.1    98.4         100.0
   1968       98.7     97.9     99.0     98.5    100.5   101.9    98.3   103.2   101.3   101.1   101.1    98.3         100.0

              TABLE TOTAL-     9598.9            MEAN-   100.0          STD. DEVIATION-     2.0
D10A. SEASONAL FACTORS, ONE YEAR AHEAD
   YEAR       JAN      FEB      MAR      APR      MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC          AVGE
   1969       98.7     97.9     99.0     98.6    100.6   102.0    98.0   103.2   101.3   101.1   101.0    98.3         100.0
```

```
                         Transportation, Communication - Alberta     72-508
D10.  FINAL SEASONAL FACTORS
   YEAR       JAN      FEB      MAR      APR      MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC          AVGE
   1961       94.9     94.0     94.4     95.8    101.7   105.7   106.4   106.5   104.3   101.3    98.7    96.0         100.0
   1962       95.1     94.2     94.6     95.8    101.6   105.5   106.3   106.4   104.1   101.2    98.7    96.1         100.0
   1963       95.3     94.6     95.0     95.8    101.5   105.1   105.9   106.3   103.9   101.1    98.8    96.4         100.0
   1964       95.6     95.1     95.4     95.8    101.4   104.6   105.4   106.2   103.7   100.9    98.9    96.6         100.0
   1965       95.9     95.5     95.8     96.0    101.3   104.1   104.9   106.0   103.5   100.8    99.0    96.7         100.0
   1966       96.2     95.9     96.1     96.1    101.4   103.8   104.6   105.8   103.5   100.9    99.2    96.9         100.0
   1967       96.2     95.9     96.1     96.2    101.4   103.6   104.4   105.6   103.5   100.9    99.2    96.9         100.0
   1968       96.2     95.9     96.1     96.3    101.4   103.6   104.3   105.5   103.5   100.9    99.1    96.9         100.0

              TABLE-TOTAL-     9597.9            MEAN-   100.0          STD. DEVIATION-     4.1
D10A. SEASONAL FACTORS, ONE YEAR AHEAD
   YEAR       JAN      FEB      MAR      APR      MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC          AVGE
   1969       96.2     95.9     96.1     96.3    101.4   103.6   104.2   105.5   103.5   100.9    99.1    96.9         100.0
```

Poor copy

Trade - Alberta 72-508

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1961	97.3	95.5	97.1	98.5	99.7	101.0	100.9	101.5	101.6	101.3	101.9	103.2	100.0
1962	97.4	95.7	97.3	98.6	99.9	101.0	100.8	101.4	101.6	101.2	101.8	103.1	100.0
1963	97.4	96.0	97.3	98.7	99.8	101.0	100.9	101.3	101.4	101.1	101.8	103.0	100.0
1964	97.4	96.3	97.4	98.8	99.8	101.1	100.9	101.1	101.1	100.9	101.6	102.7	99.9
1965	97.7	96.9	97.7	99.0	99.9	101.2	100.9	100.8	100.7	100.7	101.5	102.5	99.9
1966	97.9	97.1	97.9	99.2	99.9	101.3	100.9	100.6	100.4	100.6	101.6	102.5	100.0
1967	98.0	97.2	98.1	99.2	100.0	101.3	100.9	100.4	100.1	100.5	101.6	102.5	100.0
1968	98.1	97.2	98.2	99.3	100.0	101.4	100.9	100.3	99.9	100.5	101.5	102.5	100.0

TABLE TOTAL- 9597.0 MEAN- 100.0 STD. DEVIATION- 1.9

D10A. SEASONAL FACTORS, ONE YEAR AHEAD :

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1969	98.1	97.3	98.3	99.3	100.0	101.4	100.9	100.3	99.9	100.4	101.5	102.4	100.0

Poor copy

Total Non-Agricultural Labor Force - Alberta 72-508

```
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            TOTAL
  1961   292573.  292722.  294013.  296470.  304180.  306073.  305956.  308339.  308976.  309681.  308014.  306513.         3633516.
  1962   306120.  305371.  310717.  314030.  310984.  315438.  319770.  320938.  320979.  320475.  320507.  322432.         3787755.
  1963   318723.  320305.  319473.  319636.  322429.  321612.  320269.  320203.  323816.  326218.  328743.  331306.         3873197.
  1964   334241.  334559.  332310.  335971.  334434.  335979.  338865.  339650.  341693.  344142.  347040.  345918.         4063299.
  1965   351227.  352684.  353215.  352774.  356542.  359061.  360274.  365166.  362699.  367469.  369366.  371825.         4322317.
  1966   368870.  374710.  376393.  380440.  377009.  379374.  381876.  382732.  385863.  388317.  388400.  393620.         4577599.
  1967   401925.  400580.  407513.  405515.  408926.  410458.  411933.  412859.  415407.  415329.  418770.  420503.         4929714.
  1968   422064.  422306.  422497.  427664.  426506.  425049.  423916.  424371.  428748.  434430.  444539.  444829.         5146975.

  AVGE   349480.  350423.  352017.  353812.  355178.  356665.  357869.  359285.  361022.  363257.  365672.  367118.
             TABLE TOTAL- 34234016.          MEAN- 357646.          STD. DEVIATION-  43520.
```

Community, Business, Personal Services - Alberta 72-508

```
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            TOTAL
  1961    80081.   80071.   80923.   82662.   85358.   83766.   83949.   84533.   84871.   85043.   85190.   84775.         1001220.
  1962    84459.   84263.   86132.   86001.   84923.   87643.   87945.   88242.   88541.   88708.   89349.   89853.         1046057.
  1963    90297.   90367.   90768.   91652.   91946.   91430.   91748.   91794.   92704.   94713.   94678.   95391.         1107878.
  1964    96026.   95882.   95797.   96507.   97054.   97583.   99073.  100326.  101226.  102441.  102789.  103231.         1187933.
  1965   104317.  104304.  105085.  104442.  106187.  107176.  106577.  108139.  107173.  108308.  108761.  109004.         1279470.
  1966   109822.  111051.  111693.  114473.  111967.  113619.  115563.  115410.  116967.  117131.  116527.  117897.         1372118.
  1967   125635.  124182.  130179.  127818.  131461.  129132.  130086.  129188.  133028.  132653.  134571.  136183.         1564116.
  1968   135230.  135380.  134307.  136313.  138022.  140173.  139823.  141559.  142208.  145641.  150508.  147708.         1687375.

  AVGE   103107.  103350.  104448.  104984.  105852.  106315.  106846.  107399.  108340.  109330.  110297.  110505.
             TABLE TOTAL- 10246137.          MEAN- 106731.          STD. DEVIATION-  19428.
```

Manufacturing - Alberta 72-508

```
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            TOTAL
  1961   36484.5  36674.3  36062.8  35098.6  36737.7  37212.5  36776.0  37285.4  37280.2  37510.4  36865.7  37362.2         441350.2
  1962   37057.3  36764.5  37353.2  38080.9  37971.5  38616.0  39585.8  39615.2  39768.9  40029.7  40201.7  40273.1         465817.5
  1963   40409.4  40375.1  39949.3  41215.8  41161.4  40666.3  40299.6  40539.4  40761.0  40621.8  40705.4  40876.0         487580.2
  1964   41657.8  42606.8  42098.7  42120.0  41666.6  42036.8  42542.7  42274.2  43106.1  42638.6  43268.2  43310.9         509327.2
  1965   43413.2  43523.5  43767.7  42890.8  44298.9  44915.2  45981.2  46023.6  45394.9  45785.1  46335.2  47384.1         539712.9
  1966   45753.2  45846.3  45663.1  45820.5  45618.9  46041.7  47000.6  46474.2  46837.4  48365.2  48756.9  48780.9         560958.6
  1967   48261.0  48311.9  48556.6  48860.2  49059.3  48507.5  50437.5  49356.3  48523.5  48338.8  48454.4  48372.9         584070.1
  1968   50268.6  50271.0  50214.3  50558.8  49644.0  49645.6  43216.3  50004.6  49749.2  50065.7  50065.6  51060.7         594763.1

  AVGE   42913.1  43046.7  43024.4  43080.7  43269.9  43455.2  43230.0  43821.6  43927.5  44169.4  44331.6  44677.6
             TABLE TOTAL- 4183545.0          MEAN- 43578.6          STD. DEVIATION-  4504.5
```

Poor copy

```
                    Transportation, Communication - Alberta      72-508
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            TOTAL
  1961   41756.3  41928.8  42269.4  43105.1  43267.8  43409.6  43080.5  43549.4  44025.2  44630.9  43878.2  43647.3         520047.6
  1962   43660.4  43519.5  43939.3  44245.3  43794.9  44922.9  45450.0  45294.6  46008.8  45066.9  44574.7  44759.0         535234.9
  1963   44425.3  44707.2  44626.4  44693.3  46105.2  46423.9  45228.9  45793.3  45696.7  45817.9  46439.0  46593.2         546569.8
  1964   47137.5  47238.0  47047.0  47065.5  47157.3  46842.1  47232.6  47359.4  47746.8  47586.3  48028.7  47739.5         568271.2
  1965   47942.1  48252.3  47825.1  47103.2  47071.9  47061.3  47458.4  47369.2  47327.9  47939.9  47983.1  48801.6         572139.6
  1966   49171.7  48506.5  48305.7  49126.1  47546.9  47786.3  47892.6  48404.5  48597.3  48690.7  48907.0  49753.3         582037.4
  1967   49657.3  48648.4  48335.0  49589.9  49612.6  49790.4  50579.1  50101.4  49446.9  49344.8  48993.6  48494.0         595133.1
  1968   48554.3  48370.2  48575.5  48931.4  49696.2  49313.2  47949.7  49230.8  49165.1  49154.1  49423.4  49231.0         586594.6

  AVGE   46413.2  46559.8  46562.1  46727.5  46832.7  46944.9  46958.9  47011.4  47251.8  47277.7  47278.4  47376.1
           TABLE TOTAL- 4505997.0             MEAN- 46937.5            STD. DEVIATION-  2165.6
```

```
                                   Trade - Alberta      72-508
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            TOTAL
  1961   55306.3  55583.3  56121.6  56672.1  59352.0  58223.2  58209.9  59404.9  58446.1  59136.0  59070.0  59103.8         692629.1
  1962   58754.0  59201.1  59415.2  60172.0  60226.1  60303.7  60188.8  60526.8  60555.4  60465.9  60681.4  60728.8         720408.9
  1963   60467.3  60709.2  62926.9  60598.0  60407.2  61085.4  61573.4  61877.1  62511.1  62796.7  62875.0  63503.0         739229.1
  1964   63523.0  64038.9  63549.2  63141.2  63634.1  63506.5  64049.1  64297.0  64389.6  64518.7  64845.9  64824.2         768316.9
  1965   65532.1  66131.1  65621.9  67374.3  67596.9  67700.4  68202.4  68536.3  69719.1  70022.6  70337.0  70332.5         817106.6
  1966   71385.9  72181.3  73019.3  72896.9  73450.3  73755.8  73634.7  74370.9  74019.8  74550.1  74828.8  75511.0         883604.6
  1967   76035.3  75826.9  76476.3  76345.1  76103.7  77771.3  77398.6  76792.9  77416.8  77894.3  78958.7  79843.1         925807.9
  1968   79441.4  79795.6  80029.4  80077.8  80614.1  79797.6  80282.6  79751.2  80741.7  82024.9  82921.3  84033.0         969509.7

  AVGE   66305.6  66592.0  66967.3  67139.6  67548.6  67767.9  67742.4  68069.6  68474.9  68926.1  69302.3  69609.9
           TABLE TOTAL- 6516575.0             MEAN- 67880.9            STD. DEVIATION-  8029.9
```

Poor copy

Total Non-Agricultural Labor Force - Alberta 72-508

```
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                     9-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  0.98
 YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC            TOTAL
 1961   291173. 293274. 295927. 299036. 302428. 305273. 307102. 308275. 308869. 308855. 307901. 306595.        3634703.
 1962   305261. 307433. 309535. 311926. 314302. 316573. 318651. 320247. 321040. 321139. 320941. 320706.        3788836.
 1963   320232. 319402. 319907. 320559. 321074. 321047. 321029. 321590. 323239. 325953. 329057. 331624.        3875108.
 1964   333177. 333782. 333747. 333591. 334783. 336346. 338091. 340023. 342006. 343904. 345927. 348173.        4063857.
 1965   350165. 351749. 353092. 354343. 356105. 358615. 361228. 363438. 365645. 367507. 368938. 370152.        4321028.
 1966   371943. 374075. 376331. 377995. 378949. 379726. 381239. 383252. 385292. 387464. 390234. 393947.        4580421.
 1967   398145. 402094. 405080. 407140. 408770. 410325. 411773. 413268. 414684. 416468. 418456. 420199.        4926399.
 1968   421510. 422633. 423757. 424337. 425228. 424912. 424595. 425831. 429625. 434792. 440150. 445384.        5143312.

 AVGE   349076. 350603. 352171. 353723. 355211. 356596. 357963. 359498. 361306. 363260. 365200. 367097.
            TABLE TOTAL- 34333212.          MEAN- 357639.          STD. DEVIATION-  43362.
```

Community, Business, Personal Services - Alberta 72-508

```
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                     13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.05
 YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC            TOTAL
 1961    80503.  81199.  81996.  82799.  83548.  84112.  84489.  84702.  84786.  84800.  84836.  84854.        1002621.
 1962    84952.  84963.  85261.  85743.  86348.  86985.  87578.  88102.  88581.  89007.  89386.  89802.        1046608.
 1963    90279.  90729.  91084.  91323.  91470.  91609.  91841.  92259.  92897.  93683.  94480.  95145.        1106794.
 1964    95609.  95905.  96162.  96534.  97133.  97988.  99026. 100128. 101174. 102114. 102885. 103466.        1188122.
 1965   103943. 104386. 104867. 105402. 105964. 106513. 107037. 107459. 107785. 108095. 108562. 109253.        1279263.
 1966   110068. 110930. 111777. 112565. 113328. 114043. 114728. 115487. 116390. 117495. 118865. 120576.        1376250.
 1967   122611. 124732. 126605. 128069. 129083. 129792. 130446. 131238. 132232. 133319. 134253. 134875.        1557252.
 1968   135222. 135525. 135996. 136723. 137695. 138925. 140339. 141825. 143389. 144893. 146316. 147493.        1684338.

 AVGE   102886. 103546. 104218. 104895. 105571. 106246. 106935. 107650. 108404. 109176. 109948. 110683.
            TABLE TOTAL- 10241216.          MEAN- 106679.          STD. DEVIATION-  19271.
```

Manufacturing - Alberta 72-508

```
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                     13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.65
 YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC            TOTAL
 1961   36223.6 36167.6 36171.3 36241.6 36410.1 36664.0 36944.4 37168.9 37263.3 37236.9 37191.0 37198.8        440891.2
 1962   37250.2 37378.8 37610.7 37952.7 38349.4 38771.1 39183.6 39544.3 39839.9 40042.3 40159.9 40261.3        466352.1
 1963   40405.6 40572.6 40700.4 40791.9 40806.1 40755.8 40659.5 40567.7 40545.9 40645.6 40873.5 41166.4        488499.7
 1964   41455.2 41706.7 41836.6 41999.3 42072.2 42161.6 42306.7 42510.6 42734.5 42952.4 43129.9 43260.3        508175.6
 1965   43358.4 43472.1 43631.6 44026.1 44460.4 44925.3 45358.8 45710.3 45947.3 46063.9 46091.4 46061.4        539158.6
 1966   45976.9 45867.9 45792.3 45762.9 45857.6 46085.5 46450.0 46922.9 47444.8 47917.9 48270.1 48492.6        560830.8
 1967   48576.0 48603.8 48662.6 48808.0 48991.3 49079.3 49012.9 48814.5 48620.5 48560.0 48720.5 49110.5        585549.8
 1968   49716.4 50175.0 50142.3 49622.4 48835.9 48116.4 47813.0 48070.2 48717.0 49510.2 50249.2 50961.2        591912.3

 AVGE   42870.3 42993.0 43081.8 43150.4 43221.6 43319.9 43466.7 43663.6 43889.1 44116.1 44335.7 44561.9
            TABLE TOTAL- 4181330.0          MEAN- 43555.5          STD. DEVIATION-  4410.6
```

Poor copy

Transportation, Communication - Alberta 72-508

```
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.86
 YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC              TOTAL
 1961   41830.3  42135.1  42465.6  42812.3  43159.0  43469.2  43718.4  43881.0  43955.1  43945.9  43983.8  43791.8         519047.6
 1962   43717.0  43721.8  43854.0  44120.4  44464.7  44799.2  45054.6  45175.6  45154.6  45024.2  44925.5  44644.9         534556.1
 1963   44598.1  44667.0  44855.0  45101.3  45334.7  45510.7  45624.6  45710.1  45835.1  46045.4  46342.1  46669.1         546283.0
 1964   46930.9  47093.3  47132.3  47113.7  47090.9  47122.9  47227.9  47394.8  47569.8  47722.3  47826.0  47852.6         568066.6
 1965   47786.3  47655.5  47433.3  47336.7  47221.9  47185.5  47240.5  47378.3  47570.0  47773.1  47969.8  48156.9         570768.6
 1966   48304.4  48368.4  48335.5  48245.1  48151.7  48097.3  48105.9  48239.5  48489.6  48814.5  49157.6  49442.1         581741.3
 1967   49631.1  49720.1  49750.5  49759.6  49793.0  49828.9  49849.6  49780.3  49593.9  49300.1  48953.9  48673.1         594624.0
 1968   48560.4  48621.1  48755.6  48883.6  48937.9  48916.9  48865.9  48848.0  48906.4  49028.4  49159.1  49318.4         586805.6

 AVCF   46418.7  46496.6  46580.9  46671.6  46767.9  46865.1  46960.9  47050.9  47134.1  47206.7  47264.7  47318.6
          TABLE TOTAL- 4501356.0            MEAN- 46894.3            STD. DEVIATION-  2143.9
```

Trade - Alberta 72-508

```
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.13
 YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC              TOTAL
 1961   55447.3  55914.6  56456.0  57022.9  57571.7  58006.4  58322.1  58541.4  58686.0  58766.0  58807.6  58852.2         692393.5
 1962   58941.3  59114.7  59379.1  59704.1  60024.3  60268.4  60413.6  60479.1  60515.0  60561.9  60613.7  60641.4         720657.0
 1963   60632.9  60603.5  60602.4  60654.5  60815.1  61094.5  61470.9  61902.1  62349.8  62768.7  63112.2  63364.9         739376.3
 1964   63515.5  63554.6  63554.6  63547.2  63599.7  63714.5  63911.4  64132.0  64364.1  64574.5  64787.7  65059.6         769313.3
 1965   65416.5  65864.6  66351.9  66846.9  67341.9  67839.3  68342.8  68949.4  69348.2  69869.2  70428.5  70989.7         817488.6
 1966   71556.0  72109.3  72623.3  73074.9  73414.4  73656.5  73844.5  74049.7  74304.8  74622.0  74997.5  75379.4         883636.3
 1967   75717.0  76001.6  76255.6  76497.4  76712.9  76947.4  77198.9  77467.4  77769.1  78122.6  78516.5  78957.6         926153.0
 1968   79352.3  79761.1  79999.5  80092.0  80090.1  80050.2  80159.9  80516.6  81122.5  81840.9  82583.0  83310.4         968912.3

 AVCF   66328.0  66617.3  66903.4  67178.7  67443.6  67697.1  67957.8  68242.1  68557.3  68890.7  69230.8  69569.3
          TABLE TOTAL- 6516893.0            MEAN- 67894.3            STD. DEVIATION-  8015.1
```

Poor copy

Business Services - Alberta 72-002

* B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	103300.	111700.	100100.	91600.	90300.	94200.	99200.	97800.	96900.	94200.	94300.	100400.	1172500.
1962	112100.	115000.	112100.	92600.	93400.	93900.	95900.	96400.	94400.	92000.	95300.	96400.	1189900.
1963	102200.	103100.	99500.	88800.	85300.	89300.	93900.	95600.	95300.	93300.	94900.	97300.	1143600.
1964	105200.	104400.	106300.	91800.	93400.	97400.	99000.	100000.	96700.	111000.	108700.	106500.	1220300.
1965	112500.	116200.	119600.	109800.	112700.	122800.	130200.	127400.	120600.	131600.	130500.	120900.	1453900.
1966	126600.	145000.	148900.	133700.	135500.	146900.	155500.	161000.	164500.	165100.	171000.	176400.	1839900.
1967	186700.	178400.	180300.	171000.	170900.	174400.	178500.	183300.	174100.	176600.	179200.	183600.	2145500.
1968	194900.	196400.	195700.	181500.	181600.	184900.	186400.	192000.	182400.	193700.	184900.	191200.	2252600.
AVGE	132313.	133775.	133913.	120100.	120399.	125425.	128598.	131603.	128175.	130638.	132913.	135225.	

TABLE TOTAL- 12425100. MEAN- 129428. STD. DEVIATION- 30682.

* Note: All data to be read 3 decimal places left of indicated decimal.

Personal Services - Alberta 72-002

* B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	86600.	87500.	89000.	93600.	99400.	119100.	122600.	119200.	109900.	93000.	91900.	88300.	1199700.
1962	89300.	90500.	91000.	93800.	99100.	117400.	119800.	115300.	109700.	93900.	91800.	89900.	1201500.
1963	89200.	90500.	91900.	92500.	98300.	114400.	121000.	117800.	111200.	94400.	95300.	94600.	1215600.
1964	96000.	98300.	99400.	99000.	106900.	123100.	131100.	131800.	125200.	110300.	107700.	105300.	1335200.
1965	103400.	103500.	111800.	112000.	117100.	133900.	133800.	139400.	132500.	113300.	119300.	116900.	1455800.
1966	115500.	123100.	125100.	123600.	129500.	150900.	160600.	160200.	151700.	137000.	136700.	136600.	1650400.
1967	140900.	146500.	148600.	146500.	159700.	169900.	174200.	170900.	164600.	149900.	148500.	148200.	1868200.
1968	148900.	150800.	153600.	150300.	157000.	171700.	181400.	180900.	176000.	157200.	156700.	154800.	1939700.
AVGE	109350.	112025.	113800.	113913.	120175.	137525.	143738.	141938.	134975.	119738.	118425.	116963.	

TABLE TOTAL- 11866100. MEAN- 123605. STD. DEVIATION- 26476.

* Note: All data to be read 3 decimal places left of indicated decimal.

Hotels, Restaurants and Taverns - Alberta 72-002

* B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	57240.	58420.	59870.	63540.	67580.	82600.	87340.	86430.	79570.	65890.	64960.	63850.	837290.
1962	64190.	66330.	67040.	69270.	73500.	89390.	92140.	89270.	82060.	67420.	66460.	64190.	891260.
1963	64030.	65400.	66420.	66980.	72280.	86720.	91550.	89930.	84580.	72350.	69810.	69630.	900280.
1964	70610.	73400.	74570.	73010.	79870.	93420.	102250.	101710.	96550.	83110.	81480.	78180.	1008360.
1965	82050.	82070.	83180.	84870.	89340.	103940.	108730.	109170.	103490.	89600.	89550.	88800.	1113990.
1966	106010.	90740.	95420.	94580.	100520.	115290.	124420.	127000.	118820.	105280.	105400.	105200.	1288680.
1967	108500.	114490.	116640.	113300.	124700.	132930.	137370.	135900.	131290.	116270.	113590.	112650.	1457830.
1968	114590.	115870.	120040.	116870.	123960.	137240.	144670.	143230.	138760.	135120.	117260.	120390.	1527900.
AVGE	83501.	83340.	85399.	85303.	91481.	105191.	111059.	110330.	104390.	91880.	88564.	87761.	

TABLE TOTAL- 9025590. MEAN- 94017. STD. DEVIATION- 23352.

* Note: All data to be read 1 decimal places left of indicated decimal.

Poor copy

Business Services - Alberta 72-002

* D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	98861.	100947.	94132.	98426.	91055.	99180.	100537.	93632.	96125.	96591.	94414.	100712.	1173141.
1962	102685.	104473.	105274.	99424.	101172.	98441.	97349.	97213.	96581.	93644.	94817.	96727.	1187737.
1963	94427.	94571.	93598.	95292.	93117.	92709.	95395.	90066.	93181.	94421.	93063.	97134.	1132022.
1964	93319.	97125.	99667.	93166.	100489.	100923.	100491.	99924.	93315.	110934.	107763.	106525.	1212659.
1965	106060.	109423.	112372.	116915.	120504.	126467.	121834.	126709.	124153.	131177.	129631.	129934.	1465113.
1966	129512.	137795.	140615.	141522.	143372.	150515.	157371.	159130.	160553.	165152.	170509.	175517.	1841266.
1967	177663.	170194.	170409.	180437.	180324.	173331.	180208.	180481.	179400.	178324.	179582.	182223.	2146220.
1968	185679.	187454.	185430.	191116.	192011.	184139.	187130.	188568.	187620.	183512.	185799.	183348.	2253577.
AVGE	124152.	125247.	126230.	127669.	128643.	129460.	130134.	130369.	131717.	131669.	132604.	134001.	

TABLE TOTAL- 12424702. MEAN- 129424. STD. DEVIATION- 35500.

* Note: All data to be read 3 decimal places left of indicated decimal.

Personal Services - Alberta 72-002

* D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	96329.	95874.	97215.	100341.	101096.	103928.	102751.	102878.	100146.	98368.	99734.	98722.	1197380.
1962	99032.	98942.	97957.	100459.	100793.	102756.	100765.	99622.	100994.	99319.	99542.	99717.	1209997.
1963	99523.	99497.	99334.	99001.	100131.	100771.	102390.	102050.	102545.	103952.	103642.	104549.	1215373.
1964	105533.	106830.	106500.	105899.	103794.	109413.	111845.	114865.	116026.	116404.	116290.	116535.	1334922.
1965	113319.	116311.	118574.	119621.	118985.	120203.	119537.	122384.	123334.	124713.	127266.	127010.	1457157.
1966	125219.	131040.	131612.	131711.	131135.	136415.	139456.	141676.	141912.	144233.	146395.	148706.	1643416.
1967	152233.	155290.	155376.	155926.	161533.	154291.	152105.	151985.	154245.	157697.	159618.	160750.	1870272.
1968	160590.	159441.	160337.	159905.	153639.	156208.	159022.	161401.	165243.	165479.	167211.	167642.	1941243.
AVGE	119473.	120203.	121033.	121607.	122638.	123008.	123435.	124604.	125544.	126270.	127329.	128069.	

TABLE TOTAL- 11866723. MEAN- 123612. STD. DEVIATION- 23926.

* Note: All data to be read 3 decimal places left of indicated decimal.

Hotels, Restaurants and Taverns - Alberta 72-002

* D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	64521.	64939.	66051.	69031.	69202.	70735.	71427.	72340.	71884.	71169.	71356.	72372.	835526.
1962	72011.	73465.	73700.	75200.	75240.	76957.	75638.	74942.	74283.	72813.	73481.	72823.	890453.
1963	71358.	72084.	72611.	72769.	74030.	75237.	75713.	75873.	76831.	77947.	76941.	78819.	900212.
1964	76821.	80424.	80957.	79271.	81734.	82057.	85594.	86527.	88188.	89239.	89563.	88156.	1008438.
1965	87268.	89174.	89147.	92027.	91281.	92690.	92326.	93694.	95194.	95287.	98144.	98719.	1114949.
1966	111406.	97913.	101247.	102108.	102428.	104028.	107111.	109839.	109961.	110844.	115299.	117337.	1289519.
1967	113003.	123153.	123025.	121972.	127117.	120910.	119424.	118128.	122208.	121306.	124234.	125170.	1459648.
1968	116601.	124524.	126325.	125644.	125953.	125723.	126353.	124796.	129502.	140479.	128224.	133361.	1528981.
AVGE	89374.	90709.	91620.	92254.	93373.	93467.	94198.	94517.	96006.	97385.	97218.	98345.	

TABLE TOTAL- 9027697. MEAN- 94039. STD. DEVIATION- 21283.

* Note: All data to be read 1 decimal places left of indicated decimal.

Poor copy

Business Services - Alberta 72-002

* D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.49

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	97544.	97514.	97572.	97840.	98320.	98790.	99135.	98753.	98426.	99497.	99255.	100512.	1181951.
1962	101553.	102729.	102747.	101960.	100517.	99075.	97682.	96631.	95925.	95425.	95114.	94931.	1164740.
1963	94781.	94451.	94039.	93691.	93581.	94001.	94771.	95559.	96249.	96360.	97220.	97436.	1142838.
1964	97734.	98214.	98767.	99129.	99412.	99996.	101002.	102405.	103987.	105471.	106665.	107632.	1220465.
1965	108905.	110658.	113209.	116301.	119399.	121986.	124027.	125529.	126693.	127913.	129465.	131350.	1455429.
1966	133482.	135752.	138903.	142424.	146446.	150765.	155156.	159663.	163934.	167765.	170699.	173591.	1839066.
1967	175320.	177514.	178663.	179420.	179826.	179964.	179763.	179363.	179238.	179697.	180714.	182393.	2152282.
1968	184359.	186529.	188321.	189510.	189969.	189659.	188812.	187785.	186929.	186491.	186359.	186563.	2251281.
AVGE	124310.	125445.	126524.	127535.	128464.	129290.	130019.	130711.	131436.	132265.	133212.	134301.	

TABLE TOTAL- 12428039. MEAN- 129459. STD. DEVIATION- 36414.

* Note: All data to be read 3 decimal places left of indicated decimal.

Personal Services - Alberta 72-002

* D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.08

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	96442.	97421.	98536.	99849.	101080.	101941.	102190.	101804.	101019.	100125.	99408.	98994.	1198856.
1962	98964.	99272.	99756.	100275.	100704.	100904.	100845.	100595.	100217.	99813.	99444.	99141.	1199929.
1963	98914.	98841.	99031.	99476.	100108.	100861.	101603.	102253.	102857.	103456.	104070.	104738.	1216208.
1964	105429.	106095.	106786.	107673.	108885.	110418.	112127.	113811.	115205.	116144.	116699.	117028.	1336298.
1965	117345.	117749.	118223.	118725.	119254.	119912.	120833.	122002.	123365.	124892.	126454.	127824.	1456576.
1966	128911.	129815.	130830.	132148.	133375.	135946.	138165.	140381.	142566.	144738.	146902.	149303.	1653576.
1967	151917.	154365.	156141.	156892.	156663.	155821.	154985.	154740.	155302.	156567.	158174.	159559.	1871123.
1968	160259.	160307.	159847.	159319.	159084.	159402.	160397.	161902.	163668.	165316.	166755.	167910.	1944162.
AVGE	119773.	120483.	121150.	121795.	122457.	123151.	123893.	124686.	125525.	126381.	127238.	128062.	

TABLE TOTAL- 11876708. MEAN- 123716. STD. DEVIATION- 23937.

* Note: All data to be read 3 decimal places left of indicated decimal.

Hotels, Restaurants and Taverns - Alberta 72-002

* D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.67

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	64643.	65605.	66781.	68060.	69409.	70528.	71314.	71704.	71825.	71839.	71908.	72116.	835724.
1962	72577.	73286.	74129.	74936.	75519.	75739.	75565.	75057.	74343.	73573.	72898.	72401.	890022.
1963	72154.	72195.	72544.	73139.	73930.	74780.	75569.	76222.	76759.	77270.	77797.	78355.	900714.
1964	78873.	79367.	79933.	80700.	81759.	83169.	84860.	86512.	87814.	88504.	88684.	88657.	1008833.
1965	88728.	89098.	89748.	90606.	91480.	92262.	92783.	93525.	94904.	96895.	99143.	101135.	1120306.
1966	102446.	102926.	102894.	102880.	103303.	104451.	106345.	108504.	110406.	112277.	114162.	116149.	1286741.
1967	118235.	120176.	121526.	122096.	121968.	121397.	120889.	120798.	121189.	121828.	122552.	123239.	1455892.
1968	123788.	124243.	124595.	125017.	125517.	126466.	127828.	129541.	131406.	132953.	134127.	134948.	1540526.
AVGE	90181.	90862.	91531.	92179.	92859.	93599.	94394.	95233.	96081.	96892.	97659.	98375.	

TABLE TOTAL- 9038724. MEAN- 94153. STD. DEVIATION- 21296.

* Note: All data to be read 1 decimal places left of indicated decimal.

Community, Business, Personal Services - Canada 72-508

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	101020.	101810.	103340.	104930.	108090.	107970.	106730.	107230.	108470.	109540.	110240.	1048 0.	1278170.
1962	108580.	109180.	110750.	110520.	112390.	114340.	113130.	112690.	104310.	114710.	115250.	1147 0.	1340570.
1963	115260.	115990.	117000.	117560.	119260.	120640.	118820.	118980.	120480.	122320.	122740.	1220 0.	1431110.
1964	122440.	123400.	124370.	125010.	126880.	127970.	127600.	127130.	127980.	130310.	131060.	1308 0.	1525010.
1965	131550.	132110.	132570.	132720.	135030.	137840.	136240.	136710.	138000.	139990.	141390.	4 4 0.	1634640.
1966	140400.	141640.	142060.	143640.	145550.	147750.	146590.	145910.	148750.	149910.	149440.	1417 0.	1750380.
1967	147690.	149680.	152680.	152930.	156770.	159270.	158720.	157770.	160150.	161240.	162670.	1514 0.	188[illegible].
1968	161100.	162560.	162970.	162830.	166500.	169320.	169170.	167550.	171230.	172980.	174900.	1740 0.	20151[illegible].
AVGE	128505.	129546.	130718.	131268.	133809.	135638.	134625.	134246.	134921.	137625.	138469.	13 6 9.	

TABLE TOTAL- 12856060. MEAN- 133917. STD. DEVIATION- 20692.

All data to be read 1 decimal place right of indicated decimal.

Business Services - Canada 72-002

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	96000.	97600.	976[illegible].	959[illegible]0.	95200.	101200.	102800.	103[illegible]0.	104000.	102300.	1006[illegible].	9 1 0.	11995[illegible].
1962	99900.	100300.	102400.	100700.	1022[illegible]0.	105400.	104900.	106000.	105300.	103000.	104900.	0 7 0.	12377[illegible]0.
1963	102600.	103100.	1042[illegible].	1037[illegible]0.	1055[illegible].	111[illegible].	112100.	1[illegible]5[illegible]00.	114500.	112300.	113500.	1 1 0.	13079[illegible].
1964	111300.	113800.	1129[illegible].	1139[illegible]0.	118800.	1218[illegible]0.	125600.	1[illegible]7900.	129500.	126200.	125500.	2 1 0.	14513[illegible].
1965	126000.	127[illegible].	139[illegible].	133400.	135400.	13810[illegible].	140600.	142900.	143[illegible]00.	143900.	144700.	4 9 0.	16574[illegible].
1966	144300.	14[illegible].	146[illegible].	1495[illegible]0.	155000.	160[illegible].	165500.	163300.	163[illegible].	162900.	163600.	6 2 0.	1980[illegible].
1967	1594[illegible].	161[illegible].	1638[illegible].	1643[illegible]0.	17 500.	1740[illegible].	172800.	174000.	172[illegible]00.	1684[illegible].	1676[illegible].	16 6 0.	2012[illegible].
1968	165000.	16[illegible].	1676[illegible].	16[illegible]0.	174[illegible]0.	1741[illegible].	175600.	17[illegible].	178000.	1800[illegible].	1790[illegible].	[illegible]9 0.	208[illegible].
AVGE	125563.	127[illegible]25.	129[illegible].	12[illegible]675.	132750.	135725.	136863.	138700.	138813.	137375.	13742[illegible].	13 6 5.	

TABLE TOTAL- 128[illegible]00. MEAN- 133613. STD. DEVIATION- 28128.

All data to be read 3 decimal places left of indicated decimal.

Personal Services - Canada 72-002

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	93900.	938[illegible]0.	95[illegible].	971[illegible]0.	1004[illegible]0.	1057[illegible].	10[illegible]800.	106800.	103[illegible]00.	1004[illegible].	988[illegible]0.	975 0.	11995[illegible]0.
1962	94200.	94900.	959[illegible].	97800.	10[illegible]0.	1066[illegible].	10[illegible]900.	107700.	104300.	1012[illegible].	99600.	9 1 0.	121[illegible]0.
1963	97200.	9[illegible].	[illegible].	1[illegible]0.	1048[illegible]0.	10[illegible].	11[illegible]2[illegible].	111900.	109700.	107100.	1055[illegible].	1043 0.	1258[illegible].
1964	103300.	104400.	10[illegible].	1[illegible]59[illegible].	1113[illegible]0.	1169[illegible].	1198[illegible].	120100.	117900.	1149[illegible].	1135[illegible].	1114 0.	1344[illegible]0.
1965	110600.	11[illegible]200.	112[illegible].	115200.	119600.	1255[illegible].	127500.	127900.	125700.	1225[illegible]0.	1219[illegible].	1202 0.	1446[illegible]0.
1966	120300.	12[illegible]00.	1230[illegible].	1256[illegible]0.	1296[illegible].	1354[illegible].	137000.	138900.	137[illegible]00.	1339[illegible].	1320[illegible].	12 7 0.	15645[illegible].
1967	130300.	13[illegible].	1334[illegible].	13[illegible]5[illegible].	1424[illegible]0.	1482[illegible].	15[illegible]200.	150500.	148600.	1459[illegible].	1419[illegible].	13[illegible]9 0.	1696600.
1968	137300.	13[illegible]300.	1391[illegible].	14[illegible]5[illegible].	1452[illegible]0.	1495[illegible].	152100.	1532[illegible]0.	15330[illegible].	15[illegible]40[illegible].	1479[illegible].	1442 0.	1749[illegible].
AVGE	111013.	11[illegible]038.	112[illegible].	115035.	11[illegible]413.	1246[illegible].	125438.	127125.	124975.	122038.	12[illegible]148.	1179 3.	

TABLE TOTAL- 114[illegible]00. MEAN- 119443. STD. DEVIATION- 17641.

All data to be read 3 decimal places left of indicated decimal.

Poor copy

Hotels, Restaurants and Taverns - Canada - 72-002

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	66203.	66343.	[illegible]	69342.	72903.	77866.	73575.	80241.	77961.	74526.	73958.	[illegible]	[illegible]
1962	72335.	72501.	73224.	74742.	78459.	82268.	84430.	84153.	76067.	74397.	75547.	[illegible]	[illegible]
1963	74123.	[illegible]	[illegible]	76724.	80506.	85364.	87202.	88322.	86502.	84213.	82759.	[illegible]	[illegible]
1964	81567.	[illegible]	83224.	[illegible]	86369.	92959.	[illegible]	97556.	95216.	92065.	[illegible]	[illegible]	[illegible]
1965	89119.	[illegible]	[illegible]	92520.	98057.	102554.	[illegible]	106460.	104355.	101758.	103319.	[illegible]	1180645.
1966	97852.	[illegible]	[illegible]	103099.	107917.	112395.	118287.	117152.	116518.	112035.	[illegible]	[illegible]	[illegible]
1967	108362.	110828.	112575.	115316.	[illegible]	126213.	128045.	129727.	[illegible]	123992.	[illegible]	[illegible]	[illegible]
1968	116654.	[illegible]	[illegible]	119408.	[illegible]	127725.	131222.	133672.	137341.	130895.	[illegible]	[illegible]	[illegible]
AVGE	83270.	[illegible]	[illegible]	91969.	96289.	100913.	103331.	104523.	102004.	99485.	97632.	[illegible]	

TABLE TOTAL- 9277346. MEAN- 96639. STD. DEVIATION- 19243.

All data to be read 3 decimal places left of indicated decimal.

Poor copy

Community, Business, Personal Services - Canada 72-508

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1961	99.5	99.5	100.0	99.8	101.2	101.6	100.0	99.5	97.5	100.8	100.8	9[illegible].7	100.0
1962	99.6	99.6	100.0	99.8	101.1	101.6	100.0	99.5	97.7	100.8	100.8	9[illegible].7	100.0
1963	99.5	99.6	99.9	99.7	100.9	101.6	100.1	99.5	98.1	100.9	100.9	9[illegible].8	100.0
1964	99.4	99.5	99.8	99.6	100.7	101.5	100.1	99.5	98.8	100.8	100.8	9[illegible].7	100.0
1965	99.3	99.5	99.7	99.4	100.6	101.5	100.2	99.4	99.4	100.8	100.7	9[illegible].6	100.0
1966	99.3	99.4	99.6	99.3	100.6	101.5	100.2	99.3	100.1	100.7	100.8	9[illegible].7	100.0
1967	99.0	99.2	99.5	99.2	100.5	101.6	100.3	99.4	100.3	100.8	100.8	9[illegible].6	100.0
1968	99.0	99.2	99.5	99.1	100.5	101.6	100.3	99.3	100.4	100.7	100.7	9[illegible].5	100.0

TABLE TOTAL- 9601.0 MEAN- 100.0 STD. DEVIATION- 0.9

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1969	98.9	99.1	99.5	99.1	100.5	101.6	100.3	99.3	100.4	100.7	100.7	9[illegible].5	100.0

Business Services - Canada 72-002

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1961	97.6	98.1	98.7	97.3	99.4	102.1	102.5	103.5	102.8	100.4	100.1	9[illegible].5	100.0
1962	97.6	97.9	98.9	97.4	99.5	102.0	102.6	103.5	102.7	100.4	100.0	9[illegible].4	100.0
1963	97.5	97.7	99.2	97.6	99.6	102.0	102.5	103.5	102.6	100.5	100.1	9[illegible].5	100.0
1964	97.3	97.4	99.4	97.7	99.8	102.0	102.4	103.4	102.4	100.4	100.0	9[illegible].5	100.0
1965	97.3	97.5	99.4	97.9	100.2	102.0	102.3	103.2	102.2	100.5	99.9	9[illegible].4	100.0
1966	97.2	97.5	99.5	98.1	100.6	102.1	102.3	103.0	102.1	100.7	99.9	9[illegible].5	100.0
1967	97.1	97.5	99.3	98.1	100.9	102.1	102.2	102.8	101.9	100.6	99.9	9[illegible].5	100.0
1968	97.0	97.6	99.1	98.1	101.0	102.2	102.1	102.7	101.9	100.7	99.9	9[illegible].4	100.0

TABLE TOTAL- 9599.4 MEAN- 100.0 STD. DEVIATION- 2.1

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1969	97.0	97.6	99.1	98.2	101.0	102.3	102.1	102.6	101.8	100.7	99.9	9[illegible].4	100.0

Personal Services - Canada 72-002

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1961	95.1	95.0	95.7	97.3	100.8	105.2	106.2	106.4	103.2	100.1	98.3	9[illegible].5	100.0
1962	95.1	95.1	95.8	97.4	100.7	105.2	106.2	106.3	103.2	100.1	98.3	9[illegible].5	100.0
1963	95.2	95.3	95.9	97.4	100.7	105.1	106.1	106.2	103.3	100.2	98.4	9[illegible].5	100.0
1964	95.2	95.4	95.9	97.4	100.6	104.9	105.9	106.0	103.4	100.3	98.4	9[illegible].4	100.0
1965	95.3	95.6	96.1	97.5	100.6	104.7	105.7	105.8	103.4	100.[illegible]	98.4	9[illegible].2	100.0
1966	95.4	95.7	96.2	97.6	100.5	104.5	105.5	105.6	103.6	100.7	98.5	9[illegible].2	100.0
1967	95.4	95.7	96.3	97.6	100.6	104.3	105.4	105.5	103.6	100.8	98.6	9[illegible].1	100.0
1968	95.4	95.7	96.3	97.6	100.7	104.3	105.4	105.4	103.6	100.8	98.5	9[illegible].1	100.0

TABLE TOTAL- 9599.2 MEAN- 100.0 STD. DEVIATION- 4.0

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1969	95.5	95.7	96.3	97.6	100.7	104.2	105.3	105.4	103.6	100.9	98.5	9[illegible].0	100.0

Poor copy

Hotels, Restaurants and Taverns - Canada 72-002

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1961	95.0	94.9	95.1	96.7	100.7	105.7	107.6	108.0	102.5	99.6	97.8	99.0	100.0
1962	95.1	95.0	95.2	96.7	100.7	105.6	107.7	107.9	102.7	99.7	97.9	99.0	100.0
1963	95.0	95.0	95.3	96.7	100.7	105.3	107.4	107.8	103.0	100.0	98.0	99.1	100.0
1964	94.9	95.0	95.4	96.7	100.6	105.0	107.0	107.5	103.5	100.3	98.1	99.2	100.0
1965	94.8	95.1	95.6	96.8	100.6	104.8	106.6	107.2	104.0	100.6	98.1	99.9	100.0
1966	94.8	95.2	95.7	96.9	100.8	104.6	106.3	106.9	104.4	101.0	98.2	99.9	100.0
1967	94.6	95.1	95.7	96.9	100.6	104.5	106.0	106.8	104.6	101.2	98.3	99.8	100.0
1968	94.6	95.1	95.7	96.9	100.6	104.6	105.9	106.7	104.6	101.3	98.2	99.8	100.0

TABLE TOTAL- 9600.5 MEAN- 100.0 STD. DEVIATION- 4.5

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1969	94.6	95.1	95.7	97.0	100.6	104.6	105.8	106.6	104.6	101.4	98.2	99.7	100.0

Poor copy

Community, Business, Personal Services - Canada 72-508

D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	101540.	102338.	103381.	105107.	106843.	106267.	106712.	107720.	111247.	108689.	109358.	1091[illegible]5.	1278384.
1962	109051.	109655.	110784.	110733.	111162.	112571.	113120.	113230.	106715.	113847.	114326.	115016.	1340204.
1963	115782.	116477.	117093.	117877.	119195.	118791.	119744.	119518.	122802.	121258.	121687.	122320.	1430548.
1964	123178.	124038.	124539.	125557.	125996.	126036.	127509.	127818.	129565.	129257.	130034.	1312[illegible]9.	1524853.
1965	132442.	132830.	132949.	133464.	134260.	135777.	136332.	137549.	138828.	138919.	140385.	141016.	1634476.
1966	141450.	142492.	142578.	144636.	144751.	145522.	145300.	146871.	148616.	148809.	148280.	14[illegible]2[illegible]9.	1749555.
1967	149127.	153832.	153431.	154213.	155985.	156073.	155255.	158777.	159676.	160024.	161390.	16[illegible]0[illegible]5.	1886015.
1968	162809.	163911.	163815.	164267.	165672.	166678.	169679.	168651.	170601.	171717.	173675.	1748[illegible]1.	2015291.
AVGE	129422.	130323.	131084.	131902.	132858.	133562.	134413.	135017.	136007.	136565.	137392.	1341[illegible]6.	

TABLE TOTAL- 12853461. MEAN- 133895. STD. DEVIATION- 20620.

All data to be read 1 decimal place right of indicated decimal.

Business Services - Canada 72-002

D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	98369.	945[illegible]7.	939[illegible].	94534.	99741.	99146.	100263.	99730.	101188.	101928.	100520.	1010[illegible]8.	1194551.
1962	102365.	1024[illegible]1.	[illegible]	10[illegible]334.	10[illegible]745.	103329.	102287.	102455.	102516.	102582.	104872.	1044[illegible]7.	1237848.
1963	105187.	105451.	105[illegible].	105274.	105958.	108946.	109339.	111334.	111576.	111794.	113415.	112[illegible]0.	1307252.
1964	114387.	110781.	113[illegible].	115[illegible]6.	119493.	119399.	122622.	123727.	126430.	125649.	125509.	12[illegible]3[illegible]6.	1451063.
1965	129556.	135409.	140054.	135240.	135171.	135329.	137393.	138483.	14009[illegible].	143217.	144841.	1446[illegible]4.	1657482.
1966	140304.	150041.	148715.	151442.	154176.	156833.	154946.	158593.	160452.	161818.	163713.	1644[illegible]2.	18796[illegible].
1967	164235.	164043.	16451[illegible].	167461.	170055.	170358.	167097.	169332.	168906.	167136.	167693.	1678[illegible]3.	2017274.
1968	170039.	171470.	159045.	171142.	172726.	1702[illegible]8.	171983.	172518.	174737.	178721.	17911[illegible].	17[illegible]4[illegible]3.	2088[illegible]4.
AVGE	129080.	130295.	13054[illegible].	131519.	132498.	132954.	133741.	134522.	135737.	136606.	137460.	13[illegible]3[illegible]3.	

TABLE TOTAL- 12825451. MEAN- 133598. STD. DEVIATION- 27897.

All data to be read 3 decimal places left of indicated decimal.

Personal Services - Canada 72-002

D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	98781.	98695.	993[illegible].	99773.	99644.	100464.	100537.	100406.	1000[illegible].	100295.	100532.	1010[illegible]4.	11995[illegible]7.
1962	100078.	99752.	100007.	100449.	101247.	101345.	101617.	101313.	101059.	101048.	101325.	1016[illegible]3.	1210684.
1963	102134.	102542.	102842.	103372.	104071.	104413.	105836.	105363.	106[illegible]9.	106892.	107215.	1081[illegible]5.	1257906.
1964	108541.	109453.	109982.	109743.	110591.	111441.	112189.	113302.	114077.	114577.	115353.	1156[illegible]4.	1344857.
1965	116048.	116330.	117294.	118176.	118850.	119853.	120646.	120908.	121519.	121978.	123867.	1249[illegible]2.	14404[illegible]9.
1966	126045.	127460.	127804.	128746.	128765.	124567.	129817.	131505.	132388.	133070.	133969.	1347[illegible]1.	15638[illegible]3.
1967	136574.	137743.	138370.	139928.	141482.	142024.	142475.	142546.	143489.	144744.	143958.	1444[illegible]7.	1698026.
1968	143860.	141458.	144476.	144002.	144270.	143360.	145366.	145309.	147912.	149136.	150102.	1490[illegible]4.	17492[illegible]3.
AVGE	116508.	116929.	117543.	118076.	118669.	119066.	119560.	120694.	12081[illegible].	121467.	122046.	12[illegible]4[illegible]0.	

TABLE TOTAL- 11454918. MEAN- 119426. STD. DEVIATION- 17052.

All data to be read 3 decimal places left of indicated decimal.

Poor cop

```
                              Hotels, Restaurants and Taverns - Canada   , 72-002
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC              TOTAL
  1961   69659.   69681.   70304.   71713.   72417.   73673.   73839.   74291.   76044.   74841.   75649.   760[illegible]3.        878[illegible]4.
  1962   76067.   76318.   76938.   77208.   77932.   77954.   78407.   77975.   74069.   76647.   77196.   7[illegible]5[illegible]6.        924[illegible].
  1963   77992.   78551.   78853.   79346.   79971.   81013.   81159.   81915.   83564.   84238.   84425.   854[illegible]7.        976[illegible].
  1964   85586.   86677.   87265.   87516.   87810.   88574.   89783.   90743.   91569.   91835.   927[illegible]4.   929[illegible]8.       10737[illegible].
  1965   94015.   94137.   95084.   95625.   97454.   97903.   98231.   99310.  100351.  101146.  102263.  1029[illegible]7.       11794[illegible]5.
  1966  103255.  104448.  105301.  106451.  107249.  107473.  107559.  109586.  111557.  110954.  112539.  [illegible]136[illegible]9.       1300[illegible].
  1967  114513.  116544.  117549.  119015.  119664.  120833.  121750.  121044.  12152[illegible].  122485.  122571.  12[illegible]9[illegible]2.       14395[illegible].
  1968  123332.  122860.  12343[illegible].  123184.  122943.  12227[illegible].  123915.  124765.  126509.  129197.  12938[illegible].  12[illegible]2[illegible]7.       150[illegible].

  AVGE   93102.   93677.   94354.   95017.   95660.   96206.   96835.   97453.   98248.   98916.   99590.  [illegible]001[illegible]9.
            TABLE TOTAL-  9273442.          MEAN-   96596.          STD. DEVIATION-   18577.
```

Poor copy

Community, Business, Personal Services - Canada 72-508

D12. FINAL TREND CYCLE - HENDERSON CURVE

9-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 0.97

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	101270.	102500.	103759.	104998.	105876.	106621.	107447.	108380.	109206.	109575.	109384.	109150.	1278165.
1962	109298.	109776.	110273.	110909.	111875.	112344.	112070.	111492.	111330.	112077.	113594.	115112.	1340150.
1963	116035.	116474.	117161.	117753.	118148.	118575.	119221.	120049.	120865.	121495.	121961.	122423.	1430159.
1964	123104.	123981.	124723.	125354.	125889.	126515.	127289.	128114.	128874.	129579.	130354.	131237.	1525012.
1965	132060.	132682.	133132.	133647.	134376.	135366.	136436.	137467.	138451.	139358.	140173.	140883.	1634028.
1966	141662.	142509.	143365.	144212.	144925.	145565.	146319.	147136.	147868.	148384.	148723.	149168.	1749833.
1967	149989.	151287.	152829.	154386.	155817.	157027.	158009.	158848.	159591.	160353.	161203.	162114.	1881449.
1968	162883.	163669.	163988.	164056.	165498.	166547.	167720.	168975.	170395.	171917.	173434.	174890.	2014367.
AVGE	129538.	130335.	131154.	131989.	132801.	133570.	134314.	135058.	135822.	136592.	137353.	138122.	

TABLE TOTAL- 12853138. MEAN- 133887. STD. DEVIATION- 20602.

All data to be read 1 decimal place right of indicated decimal.

Business Services - Canada 72-002

D12. FINAL TREND CYCLE - HENDERSON CURVE

13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.11

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	98725.	98856.	98976.	99112.	99304.	99589.	99949.	100352.	100738.	101082.	101442.	101836.	1199960.
1962	102248.	102651.	102965.	103126.	103045.	102795.	102593.	102597.	102901.	103449.	104096.	104663.	1237127.
1963	105080.	105369.	105708.	106262.	107166.	108312.	109516.	110607.	111555.	112314.	112879.	113371.	1308137.
1964	113858.	114509.	115446.	116731.	118359.	120159.	121870.	123334.	124345.	125213.	126431.	128195.	1448448.
1965	130371.	132635.	134547.	135817.	136484.	136901.	137523.	138688.	140502.	142670.	144705.	146505.	1657346.
1966	148104.	149584.	151034.	152545.	154130.	155714.	157349.	159015.	160671.	162183.	163425.	164336.	1878088.
1967	165058.	165763.	166611.	167622.	168623.	169336.	169500.	169103.	168534.	168151.	168191.	168649.	2015140.
1968	169330.	170020.	170540.	170791.	170921.	171331.	172245.	173628.	175237.	176786.	178170.	179348.	2078344.
AVGE	129097.	129923.	130728.	131502.	132254.	133017.	133818.	134665.	135561.	136481.	137417.	138362.	

TABLE TOTAL- 12822565. MEAN- 133568. STD. DEVIATION- 27874.

All data to be read 3 decimal places left of indicated decimal.

Personal Services - Canada 72-002

D12. FINAL TREND CYCLE - HENDERSON CURVE

9-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 0.49

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	98694.	98976.	99286.	99572.	99845.	100043.	100150.	100214.	100288.	100375.	100437.	100366.	1198248.
1962	100191.	100049.	100158.	100539.	101015.	101340.	101415.	101298.	101162.	101159.	101343.	101680.	1211347.
1963	102073.	102491.	102947.	103434.	103921.	104399.	104913.	105476.	106107.	106754.	107382.	108028.	1257923.
1964	108694.	109308.	109814.	110245.	110744.	111423.	112278.	113183.	114004.	114687.	115205.	115607.	1345189.
1965	116028.	116553.	117239.	118091.	118983.	119789.	120417.	120972.	121623.	122496.	123654.	124946.	1440779.
1966	126162.	127179.	127948.	128502.	128972.	129571.	130376.	131305.	132222.	133076.	134012.	135098.	1564422.
1967	136311.	137580.	138855.	140080.	141136.	141912.	142495.	143011.	143573.	144086.	144284.	144189.	1697511.
1968	143996.	143961.	144011.	143961.	143841.	143905.	144545.	145893.	147481.	148817.	149825.	150591.	1750826.
AVGE	116519.	117012.	117532.	118053.	118557.	119048.	119574.	120169.	120807.	121431.	122018.	122563.	

TABLE TOTAL- 11466217. MEAN- 119440. STD. DEVIATION- 17083.

All data to be read 3 decimal places left of indicated decimal.

Hotels, Restaurants and Taverns - Canada 72-002

D12. FINAL TREND CYCLE - HENDERSON CURVE

9-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 0.71

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1961	69373.	69959.	70688.	71543.	72417.	73295.	74054.	74654.	75118.	75441.	75654.	758[illegible]4.	878031.
1962	76097.	76480.	76872.	77355.	77955.	78162.	77737.	76940.	76295.	76208.	76729.	775[illegible]8.	924349.
1963	78112.	78435.	78899.	79448.	80008.	80644.	81446.	82347.	83263.	84095.	84797.	853[illegible]5.	976894.
1964	86022.	86645.	87106.	87488.	87982.	88727.	89683.	90669.	91472.	92093.	92618.	931[illegible]7.	1073650.
1965	93096.	94361.	95145.	96116.	97146.	98101.	98878.	99594.	100378.	101223.	102045.	1028[illegible]9.	1179504.
1966	103561.	104422.	105403.	106276.	106892.	107508.	108376.	109494.	110716.	111775.	112658.	1136[illegible]9.	1300687.
1967	114872.	116294.	117675.	118908.	119845.	120441.	120866.	121243.	121678.	122196.	122667	1229[illegible]3.	1439645.
1968	123126.	123201.	123168.	123060.	123013.	123168.	123837.	125155.	126750.	128192.	129374.	[illegible]303[illegible]7.	1502379.
AVGE	93108.	93725.	94370.	95024.	95657.	96256.	96860.	97512.	98209.	98903.	99568.	1002[illegible]3.	

TABLE TOTAL- 9275109. MEAN- 96616. STD. DEVIATION- 18602.